

RECORDS
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Water Resources Survey



Part I:
HISTORY OF LAND AND WATER
USE ON IRRIGATED AREAS

and

Part II:
MAPS SHOWING IRRIGATED AREAS
IN COLORS DESIGNATING THE
SOURCES OF SUPPLY

Jefferson County, Montana

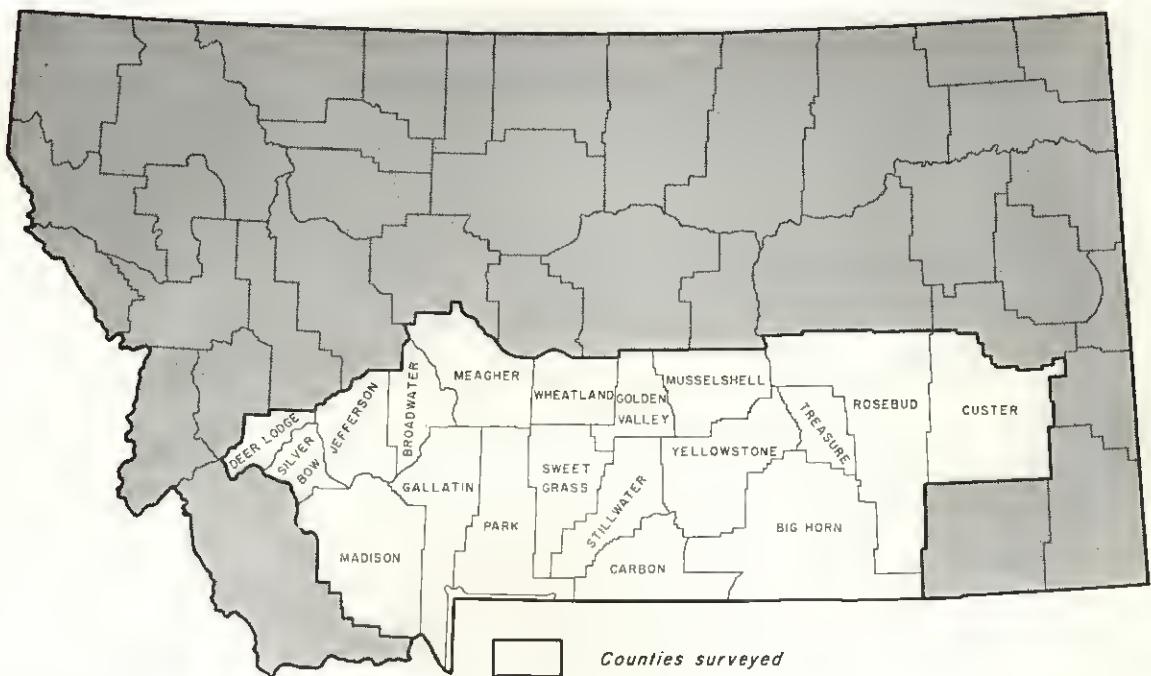
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STATE ENGINEER'S OFFICE
Helena, Montana, June, 1956

WATER RESOURCES SURVEY

JEFFERSON COUNTY MONTANA

Part I

History of Land and Water Use on Irrigated Areas



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June, 1956

STATE ENGINEER'S OFFICE

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O. W. Monson, Irrigation Engineer and Consultant, Bozeman

June, 1956

Honorable J. Hugo Aronson
Governor of Montana
Capitol Building
Helena, Montana

Dear Governor Aronson:

Submitted herewith is a consolidated report on the Water Resources Survey of Jefferson County, Montana.

This work is being carried on with funds made available to the State Engineer by the 34th Legislative Session, 1955, and in cooperation with the State Water Conservation Board and the Montana State Agricultural Experiment Station.

The report is divided into two parts. Part I consists of history of land and water use, irrigated lands, water rights, etc., and Part II contains the township maps in the county showing in color the lands irrigated from each source or canal system.

Work has been completed and reports are now available for the following counties: Big Horn, Broadwater, Carbon, Custer, Deer Lodge, Gallatin, Golden Valley, Jefferson, Madison, Meagher, Musselshell, Park, Rosebud, Silver Bow, Stillwater, Sweet Grass, Treasure, Wheatland and Yellowstone.

The office files contain minute descriptions and details of each individual water right, water and land use, etc., which are too voluminous to be included herein. These office files are available for inspection to those who are interested.

The historical data on water rights contained in this report can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up to date.

Respectfully submitted,

FRED E. BUCK, State Engineer

ACKNOWLEDGMENTS

A survey and study of water resources involves many phases of both field and office work in order to gather the necessary data to make the information complete and comprehensive. Appreciation of the splendid co-operation of various agencies and individuals who gave their time and assistance in aiding us in gathering the data for the preparation of this report is hereby acknowledged.

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Al Smith, Commissioner	
Alta M. Dawson, Clerk and Recorder	
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Owen K. Davis _____ Secretary, Old Hale Ditch Company
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Harry Alley _____ Secretary, Pipestone Water Users' Association, Inc.
Richard Opie _____ Secretary, Whitetail Ditch Company
Robert A. Schroeder _____ Secretary, Whitetail Water Users' Association

The State Engineer's Office, Water Resources Survey, hereby expresses sincere appreciation to the many ranchers, farmers and stockmen who have given their helpful cooperation in this survey.

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FOREWORD

MONTANA'S WATER RIGHT PROBLEM

Our concern over surface water rights in Montana is nearly a century old. When the first Territorial Legislature, meeting in Bannack, adopted the common law of England on January 11, 1865, the Territory's legal profession assumed that it had adopted the Doctrine of Riparian Rights. This doctrine had evolved in England and in eastern United States where the annual rainfall is generally more than twenty inches. It gave the owners of land bordering a stream the right to have that stream flow past their land undiminished in quantity and unaltered in quality and to use it for household and livestock purposes. Since the law restricted the use of the water to riparian owners and forbade them to reduce appreciably the stream flow, the early miners and ranchers in Montana favored the Doctrine of Prior Appropriation which permitted diversion and diminution of the streams. Consequently, the next day the legislature enacted a law which permitted diversion by both riparian and non-riparian owners. Whether or not this action provided Montana with one or two definitions of water rights was not settled until 1921 when the Montana Supreme Court in the Mettler vs. Ames Realty Co. case declared the Doctrine of Prior Appropriation to be the valid Montana water right law. "Our conclusion," it said, "is that the common law doctrine of riparian rights has never prevailed in Montana since the enactment of the Bannack Statutes in 1865 and that it is unsuited to the conditions here . . ."

The appropriation right which originated in California was used by the forty-niners to divert water from the stream to placer mine gold. They applied to the water the same rules that they applied to their mining claims—first in time, first in right and limitation of the right by beneficial use. Those who came to the Montana gulches brought with them these rules, applying them to agriculture as well as to mining.

The main points of consideration under the Doctrine of Prior Appropriation are:

1. The use of water may be acquired by both riparian and non-riparian landowners.
2. It allows diversion of water regardless of the reduction of the water supply in the stream.
3. The value of the right is determined by the priority of the appropriation; i.e., first in time is first in right.
4. The right is limited to the use of the water. Stream waters in Montana are the property of the State and the appropriator acquires only a right to their use. Moreover, this use must be beneficial.
5. A right to the use of water is considered real property only in the sense that it can be bought or sold; its owner may not be deprived of it except by due process of law.

The State Legislature has provided methods for the acquisition, determination of priority and administration of the right. No right may be acquired on a stream without diversion of

water and its application to a beneficial use. On unadjudicated streams, the Statutes stipulate that the diversion must be preceded by posting a notice at a point of intended diversion and by filing a copy of it within 20 days in the County Clerk's office of the county in which the appropriation is being made. Construction of the means of diversion must begin within 40 days of the posting and continue with reasonable diligence to completion. However, the Montana Supreme Court has ruled that an appropriator who fails to comply with the Statutes may still acquire a right merely by digging a ditch and putting the water to beneficial use.

To obtain a water right on an adjudicated stream, one must petition the District Court having jurisdiction over that stream for permission to make an appropriation. If the other appropriators do not object, the court gives its consent and issues a supplementary decree granting the right subject to the rights of the prior appropriators.

Inasmuch as the Montana laws do not require water users to make official records of the completion of their appropriations, it becomes advisable, as soon as the demand for the waters of a stream becomes greater than its supply, to determine the rights and priorities of each user by means of an adjudication or water right suit. This action may be initiated by one or more of the appropriators who may make all the other claimants parties to the suit. Thereupon the Judge of the District Court examines the claims of all the claimants and issues a decree establishing priority of the right of each water user. The court decree becomes in effect the deed of the appropriator to his water right.

Whenever scarcity of water in an adjudicated stream requires an allocation of the supply according to the priority of rights, the Judge upon petition of the owners of at least 15 per cent of the water rights affected must appoint a water commissioner to distribute the water. These rules were formulated to protect the rights. However, they constitute a system of local regulation which imposes such a limited control upon the individual's use of the water that they often fail to protect him.

The recordings of appropriations in local courthouses provide an incomplete record of the water rights on unadjudicated streams. In fact, the county records often bear little relation to the existing situation. Since the law places no restriction on the number and extent of the filings which may be made on an unadjudicated stream, the total amount of water claimed is frequently many times the available flow. There are numerous examples of streams becoming over appropriated. Once six appropriators each claimed all of the water in Lyman Creek near Bozeman. Before the adjudication of claims to the waters of Prickly Pear Creek, 68 parties claimed thirty times its average flow of 50 cfs. Today, the Big Hole River with an average flow of 1,131 cfs has filings totaling 173,912 cfs. A person is unable to distinguish in the county courthouses the perfected rights from the unperfected ones since the law requires no official recordation of the completion of an appropriation. Recognition by the courts of unrecorded appropriations adds to the incompleteness of these records. To further complicate the situation, appropriators have used different names for the same stream in their filings. In Montana many of the streams flow through several counties, consequently, water right filings on these inter-county streams are found distributed in two or more county courthouses. Anyone desirous of determining appropriations on a certain river or creek finds it difficult and expensive to examine records in several places. In addition, the

records are sometimes scattered because the original nine counties of 1865 have now increased to 56. As the original counties have been divided and sub-divided, the water right filings have frequently not been transcribed from the records of one county to the other. Thus, the record of an early appropriation in what is at present Powell County may be found in the courthouse of the original Deer Lodge County.

It can be readily seen that this system of recording offers little protection to rights in the use of water until they are determined by an adjudication. In other words, an appropriator does not gain a clear title to his water right until after adjudication and then the title may not be clear because the Montana system of determining rights is also faulty. In the first place, adjudications are costly, sometimes very costly when they are prolonged for years. It is estimated that litigation over the Beaverhead River, which has lasted more than twenty years, has cost the residents of the valley nearly a half a million dollars. In the second place, unless the court seeks the advice of a competent irrigation engineer, the adjudication may be based upon inaccurate evidence. In the third place, if some claimant has been inadvertently left out of the action, it is not final and may be reopened for consideration by the aggrieved party. Another difficulty arises in determining the ownership of a water right when land under an adjudicated stream becomes sub-divided in later years and the water not proportioned to the land by deed or otherwise. There is no provision made by law requiring the recording of specific water right ownerships on deeds and abstracts.

There is no provision of law for the distribution of water from an unadjudicated stream. Administration of water on an adjudicated stream is done by the District Court, but it has its drawbacks. The appointment of a water commissioner is often delayed until the shortage of water is acute and the court frequently finds it difficult to obtain a competent man for a position so temporary. The present administration of adjudicated streams which cross the county boundaries of judicial districts creates problems. Many of the water decrees stipulate headgates and measuring devices for proper water distribution, but in many instances the stipulation is not enforced, causing disagreement among the water users.

Since a water right is considered real property and may be bought and sold, the nature of water requires certain limitations in its use. One of the major faults affecting a stream after an adjudication is the failure of the District Court to have some definite control over the transfer of water rights from their designated place of use. The sale and leasing of water is becoming a common practice on many adjudicated streams and has created serious complications. By changing the water use to a different location, many of the remaining rights along the stream are disrupted, resulting in a complete breakdown of the purpose intended by the adjudication. To correct this situation, legal action must be initiated by the injured parties as it is their responsibility and not the Court's.

At one time or another all of the other Western Reclamation States have used similar methods of local regulation of water rights. Now all of them except Montana have more or less abandoned these practices and replaced them by a system of centralized state control such as the one adopted by the State of Wyoming. The key characteristics of the Wyoming system is the registration of both the initiation and completion of an appropriation in the

State Engineer's Office, the determination of rights and administration by a State Board of Control headed by the State Engineer. These methods give the Wyoming water users titles to the use of water as definite and as defensible as those which they have to their land.

When Montana began to negotiate the Yellowstone River Compact with Wyoming and North Dakota in 1939, the need for some definite information concerning our water and its use became apparent. The Legislature in 1939 passed a bill (Ch. 185) authorizing the collection of data pertaining to our uses of water and it is under this authority that the Water Resources Survey is being carried on. The purpose of this survey is six fold: (1) To catalogue by counties, in the office of the State Engineer, all recorded, appropriated and decreed water rights including use rights as they are found; (2) to map the lands upon which the water is being used; (3) to provide the public with pertinent water right information on any stream, thereby assisting them in any transaction where water is involved; (4) to help State and Federal Agencies in pertinent matters; (5) to eliminate unnecessary court action in water right disputes; (6) and to have a complete inventory of our perfected water rights in case we need to defend these rights against the encroachments of lower states.

In conclusion, some mention should be made regarding the enactment of laws for the orderly development of our ground water supplies. Delay in the enactment of these laws by other states has contributed to the over-development of these valuable natural resources. This in turn has caused financial losses and innumerable legal difficulties. A knowledge of the ground water hydrology with an established ground water code in Montana would protect the interests of those who have already developed ground water supplies as well as protect those who may drill wells in the future.

METHOD OF SURVEY

Water Resources data contained in Part I and Part II of this report are obtained from courthouse records in conjunction with individual contacts of land-ownership. A survey of this type involves extensive detailed work in both the office and field to compile a comprehensive inventory of water rights as they apply to land and other uses.

The material of foremost importance used in conducting the survey is as follows: From the files of the county courthouse the data required includes; land-ownership, water right records (decrees and appropriations), articles of incorporations of ditch companies and any other legal papers in regard to the distribution and use of water. Deed records of land ownership are reviewed and abstracts are checked for water right information when available.

Another important part of the survey is complete aerial photo coverage of each county in order to map accurately the land areas of water use. On the aerial photographs, section and township corner locations are determined by the photogrametric system, based on Government Land Office survey plats, plane-table surveys, county maps and by "on the spot" location during the field survey. Shown on the aerial photograph is all the information pertaining to the location of the irrigation system with irrigated and potentially irrigable land areas under private and incorporated ditches distinguished by different colors.

Field forms are prepared for each land-owner, showing the name of the owner and operator, photo index number, a plat defining the ownership boundary, type of irrigation system and source of water supply and the total acreage irrigated and irrigable under each. All of the appropriated and decreed water rights that apply to each ownership by the description of intended place of use are listed on the field form. During the field survey, all water rights listed on the field form are verified with the land-owner. Whenever any doubt or complication exists in the use of a water right, deed records of the land are checked to determine the absolute right of use.

So far as known, this is the first survey of its kind ever attempted in the United States. The value of the work has become well substantiated in the counties completed to date by giving Montana its first accurate and verified information concerning its water rights and their use. New development of land for irrigation purposes by State and Federal agencies is not within the scope of this report. The facts presented are as found at the time of completing each survey and provide the items and figures from which a detailed analysis of water and land use can be made.

The historical data contained in these reports can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up-to-date.

HISTORY AND ORGANIZATION

Jefferson, one of the nine original counties in the Montana Territory, was created February 2, 1865. Geographically, the county occupies a west central position in Montana and for the most part the surface area is rugged and mountainous. The Continental Divide of the Rocky Mountains forms the western boundary with several smaller spurs of the range jutting into the county. Along the northern and eastern part, a local mountain range known as the Elkhorn Mountains borders the county line. Elevations above sea level are about 4,100 feet in the Jefferson Valley at the southern end and 7,000 feet or more in the mountain ranges.

The first white men of historical record to pass through the area were members of the Lewis and Clark Expedition in 1805. On August 10, 1805, Captain Clark and party reached the forks of the Jefferson River, which now forms the southern boundary of the county. Here they cashed their canoes and continued on to the west. On July 8, 1806, Captain Clark and his party on their return trip from the Pacific were again at the forks of the Jefferson, where they recovered their canoes and continued on their journey east.

While there were possibly some white men who made temporary camps in the area now embraced in Jefferson County prior to 1863, it was in that year the first actual settlement began near the present site of Whitehall. It was here that Major Thomas W. Brooke and E. J. Stanley built the first settlement, a stage station on the old stage route between Virginia City and Fort Benton. The station and ranch were named "Old Whitehall" for Whitehall, England, which was the former home of the two men. The present town of Whitehall is about four miles south of the old stage station, but it did not really develop as a town of importance until the building of the Northern Pacific Railway through that section in 1889. Following the coming of the railway, the Jefferson and Madison Valleys were quickly settled and Whitehall soon became an important supply center for that region. The town was incorporated in 1900.

In 1864, William Sweet established a stage station and later a store, at a point about a mile southeast of the town of Boulder. The same year a stage station was built a few miles south of Jefferson City. These stage stations were located on the Virginia City - Fort Benton Stage Route, which at that time followed up the Boulder River from the Jefferson Valley and passed about a mile east of the present town of Boulder. In the years between 1865 and 1870, another stage route was established between Butte and Helena, the latter place coming into prominence due to the sensational gold discoveries in Last Chance Gulch. Quartz discoveries along this route resulted in the development of many mines and the establishment of settlements at Basin, Wickes, Corbin, Clancy and Montana City. With the opening up of the Elkhorn Silver District in 1872, along with the rapid development of the mines at Basin, Wickes, Corbin, Clancy and Montana City, a settlement grew up around the Butte-Helena Stage Station at Boulder, making it the most important supply center and town in the county. Stock ranchers and farmers that settled in the Boulder Valley brought additional prosperity to Boulder community. A good market was provided for their farm products as the mines grew in size and importance.

During the territorial days, Radersburg was the county seat of Jefferson County. By 1886, Boulder had become by far the most important town in the county and after a rather

exciting campaign the people voted to change the county seat to Boulder. Later, in 1897, when Broadwater County was created, Radersburg became a part of that county by a land transfer from Jefferson County to form Broadwater.

The town of Boulder continued to prosper during the period 1883 to 1890, when the smelter was built at Wickes and the Montana Central Railroad operated between Helena and Butte. In the early '90's the demonetization of silver resulted in the closing down of the mines. It was about this time that the smelter moved from Wickes to East Helena. A period of depression set in which continued until 1900, when new mine discoveries again revived business. An even greater activity occurred in mining, farming and stock raising through the war years of 1914 to 1918. During those years dry land farming was attempted and for two years was very successful. War time profits from farm products led to improper farming methods used in the endeavor to get the utmost in crops from the land. The result was severe crop failures during the years of 1920 and 1921 for dry land farming. At the close of the war a slump in metal prices closed many of the mines and once again came a period of depression. This period of stagnation lasted until 1933, when a revival of interest in mining took place, along with better prices for farm products.

For more than 20 years the population of Jefferson County has been almost stationary. Its population seldom drops below 4,000 and rarely exceeds 5,000. Mining and agriculture are undoubtedly the most stable industries in the county, but in recent years other developments have occurred which should be mentioned. Whitehall, with a population of about 1,000, is today the most progressive community and chief trading center in the county. A few miles east of Whitehall, on State Highway No. 10, Lewis & Clark Cavern, a State Park attracts several thousand tourists annually. Located in Boulder is the Montana State Training School for mentally retarded people. Three miles south of Boulder, the Diamond "S" Dude Ranch and Health Resort accommodates many visitors each year. Recently many of the mines in the vicinity of Boulder have been found to contain low-grade radioactive ores and are now known as "Health Mines." Hundreds of sufferers from arthritis and allied diseases have found relief in the "Health Mines" by direct exposure to the radioactivity of the ores. Capitalizing on this new discovery, the owners of many abandoned or inactive mines are doing a thriving business in the Boulder area. Other towns or small settlements still active are: Alhambra a health resort in the north part and Cardwell in the south part of the county.

Jefferson County, named after President Thomas Jefferson, is bounded on the north by Lewis and Clark County, on the east by Broadwater County, on the west by Powell, Deer Lodge and Silver Bow Counties and on the south by Gallatin and Madison Counties.

In land area the county embraces 1,651 square miles, ranking it 43rd in Montana. Extreme distances are 60 miles from north to south and 40 miles from east to west. In 1950, the population totaled 4,014 or 37th in the State's fifty-six counties.

TRANSPORTATION

Jefferson County is served by two Federal Highways, U. S. 91 and U. S. 10 south. In traveling by automobile from Butte to Helena, U. S. 91 follows a northeast direction across the county for a distance of more than 60 miles through timber and mountain scenery. This highway passes through the towns of Basin, Boulder, Jefferson City, Alhambra and Clancy. U. S. Highway No. 10 south enters the county east of Sappington Junction and follows a course parallel to the Jefferson River, passing through the town of Whitehall. From Whitehall the highway continues in a westerly direction following along Little Pipestone Creek and leaves the county a short distance east of Pipestone Pass on the Continental Divide. Points of special interest along this route are: The rugged Jefferson River Canyon, Lewis and Clark Cavern, a State Park and Pipestone Springs.

Beginning at Boulder, the county seat, are two important county roads which connect with U. S. 10 south in the southern part of the county. One road is known as the "Whitehall Hill Road" and it travels directly south out of Boulder to Whitehall. By this road the distance from Boulder to Whitehall is 30 miles. The other county road from Boulder is called "The Boulder Valley Road" and follows a southeasterly direction along the west side of the Boulder River to the Jefferson Valley where it meets U. S. Highway 10 south, six miles east of Whitehall. The distance from Boulder to Whitehall by this route is about 35 miles. Branching off from the Boulder Valley Road are two other county roads to the out-lying communities of Elkhorn and Radersburg east of Boulder. Most of the county roads are gravel surfaced and are maintained for year round travel, but severe snow storms during the winter and early spring have closed many of these side roads for short periods of time.

Railroad facilities available in the county consists of three, namely; The Great Northern, Northern Pacific and the Chicago, Milwaukee, St. Paul and Pacific. From the southwest to northeast, the county is traversed by the Havre-Butte branch line of the Great Northern Railway. For the greater part of its length through the county this railroad follows along U. S. Highway 91. Stopping points along this railroad line are at Basin, Boulder, Jefferson City, Corbin, Wickes, Alhambra and Clancy. At Boulder and Jefferson City the railroad stations are about one mile west of town. At all other points, the railroad passes directly through the towns. The Northern Pacific Railway crosses the southern part of the county from east to west. Whitehall is the main station on this line and a junction point for a branch line which extends south to Alder in Madison County. The main line of the Chicago, Milwaukee, St. Paul and Pacific Railroad enters the county in the extreme southwest corner near the railroad siding of Grace. It then travels east to Piedmont siding where it leaves the county and follows the Jefferson River south of the county line.

Bus lines which operate throughout Jefferson County are the Northland Greyhound Lines and the Intermountain Transportation Company. Both of these bus companies offer transportation service from Butte to Helena and pass through the towns of Basin, Boulder, Jefferson City, Clancy and Alhambra on U. S. Highway 91. At Whitehall, the Greyhound Line travels both east and west on Highway No. 10 south, making connections with all other bus terminals in Montana.

The nearest air port facilities for residents of Jefferson County are located at Helena and Butte.

CLIMATE

With its western boundary following the Continental Divide for upwards of 60 miles and with several groups of mountains running generally eastward from the Divide, Jefferson may be considered one of Montana's more mountainous counties. The principal valleys are: Those of the Boulder River, which rises near Elk Park, runs northeastward to Basin, eastward to Boulder, then southeastward and southward to its confluence with the Jefferson River near Cardwell; the Jefferson River, which is part of the southern boundary of the county; and Prickly Pear Creek, which flows northward through Jefferson City and Clancy. Because most of its area is very mountainous, the population is almost entirely located in or near the valley bottoms and long-period weather records from mountain areas therefore have been impossible to collect. It is reasonably certain, however, that the higher areas for which records have been kept are both cooler and wetter than the valley areas.

In the valley areas fairly long records have been kept at Boulder and Whitehall and records of precipitation have been kept during the last few years at Basin. With help from such nearby records as Butte and Helena, and from a few years' record at Dry Land Experiment Station¹, it is quite evident that the wet season is similar to that for most of the mountainous sections of the State. The wettest months in the valleys are May and June, the two months totaling 4.14 and 4.00 inches on the average for Boulder and Whitehall, respectively. A secondary precipitation maximum occurs normally each September over the valleys, normal totals for all valley stations that month ranging from 1.25 to 1.50 inches. Over the mountains winter snowfall is much heavier than in the valleys and the snowpack accumulated each season ordinarily melts but little until April or May. Late May and early June is the usual mountain snow-melt season, which results generally in full creeks and rivers for several weeks early each growing season.

During the Spring, skies are frequently cloudy, with a tendency for the often steady rains (or snows) of April and May to change to showery types of precipitation after the middle of June. During July and August there are frequent periods of clear, sunny and relatively warm weather, interrupted only briefly on occasional days by showers or thundershowers. Following September's rain (or snows) the fall season progresses rapidly toward wintry weather and although winters are cold, they are seldom severe. The growing season is relatively short at Boulder, the average date of the last 32° temperature being June 11, the first in the fall being September 6—a span of only 88 days. Although not computed, it is likely that the number of summer days on the average between 32° readings at Whitehall would be 100 or more.

Although cold air invasions, accompanied by subzero temperatures, occur a few times every winter, the cold spells last usually only a few days—but every few years a cold spell in January or February can last for a week or two. Summers are noted for their mild days (not too hot) and comfortable cool nights. In parts of the main Jefferson River Valley winds sometimes get a little strong, but most valleys are sheltered from the stronger winds and violent winds or tornadoes are almost unknown.

Stations in or near Jefferson County with fairly long records include Boulder, Whitehall, Dry Land Experiment Station, Helena and Butte. Selected data for these stations are listed:

Station	Years of Record	Normal Annual Temp.	Normal Annual Highest	Normal Annual Lowest	Wettest Year Precip.	Driest Year
Boulder	35	40.9	105	-39	11.70	18.38 (1912)
Whitehall	18	44.5	104	-32	11.26	14.83 (1938)
Helena	76	43.0	103	-42	11.30	20.04 (1881)
Butte	61	38.3	100	-52	12.67	20.55 (1909)
Dry Land Experiment Station						
(1925-1943)	19	43.7	101	-42	12.84	15.78 (1925)
Basin	5	—	—	—	13.11*	16.06 (1950)
						10.40 (1954)

*5-year average

¹Dry Land Experiment Station was located 10 miles NE of Cardwell at an elevation of 4,800 feet.

SOILS

Jefferson County lies in southwestern Montana, east of the continental divide and is bounded on the south by the Jefferson River. The major portion of the county drainage is into the Jefferson River, with the remaining streams draining into the Missouri River through Prickly Pear Creek and some minor tributaries.

The character of soils is determined by parent material, topography, vegetation and climate. Geologic materials, commonly found in the county, consist of granites, rhyolites, basalt, argillites, quartzites and limestone. The agricultural soils are derived from valley filling deposits washed from the bedrock areas. They generally consist of a mixture of materials. Alluvial soils along streams include materials derived from bedrock and from older outwash deposits.

Silt loam to sandy loam textures predominate with some clay loam soils in the stream valleys. Many soils contain a high percentage of gravel, cobbles and stones, particularly in the subsoil layers. The quantity and size of coarse fragments is usually greater near the upper ends of the fans and benches.

Soils of the grassland and agricultural area belong to the Brown great soils group. These soils have thin brown surface soils, prismatic subsoils and are underlaid by a light gray horizon of lime accumulation. In the heavily forested area the soils belong to the Gray Wooded great soils group. These have a layer of partially decomposed forest litter over light gray leached surface soils. Where best developed, the Gray Wooded soils have darker colored and more clayey subsoils. Chestnut (dark brown) and Chernozem (black) soils are found in some of the higher valleys and in park-like areas within the forest. Some of the soils at higher elevations are shallow and weakly developed.

The Gray Wooded soils are used chiefly for timber production or as watershed and wild-life areas. A large percentage of the higher lying grassland soils are used for grazing.

Practically all of the irrigated farming in Jefferson County is on Brown soils or associated Alluvial soils. These soils are generally free from harmful salts. They have high natural fertility and produce well under irrigation. Some irrigated soils are coarse textured or are underlaid at shallow depths by gravel requiring frequent irrigation. Drainage problems occur locally, but in general the soils that are irrigated in this county are well drained.

CROPS AND LIVESTOCK

Jefferson County is located on the east side of the Continental Divide in the southwest part of Montana and has a total land area of 1,056,640 acres. Of this total, there are approximately 394,853 acres in farms, with the average size farm unit containing 1,441 acres.

Many different types of topography are contained within the county, but for the most part it is mountainous. Agriculture in the mountain valleys is the principal industry. The two main types of agricultural enterprises carried on in the county are cattle raising and the production of dry land wheat.

In 1955, the county had an assessed irrigated acreage of 23,656, most of which is irrigated from the Jefferson River in the southern part and from the Boulder River and tributaries in the central part. Very few row crops are grown on the irrigated land. However, some small acreages of potatoes are grown in the vicinity of Whitehall along the Jefferson River Valley. Irrigation along the narrow Boulder River bottom lands is confined almost exclusively to the production of alfalfa and wild hay. The large valley area near the town of Boulder is also devoted to the growing of hay for livestock feeding purposes. Excellent summer grazing may be found at all higher elevations on National Forest Reserves.

The principal dry land wheat districts are Millegan Canyon in the Eureka area, locally called "Nigger Hollow" and in the East Helena District. Winter wheat is the principal crop grown on these rolling bench lands, with the remaining farm land used for livestock grazing. Northwest of Butte in Jefferson county is a high mountain valley known as Elk Park. Due to the high elevation and short growing season, the Elk Park area is limited to the growing of grass hay and small acreages of winter rye, which are used for livestock feed and pasture. Dairy farming is the principal industry of this high mountain valley, with the dairy products having a ready market in the nearby city of Butte. In 1955, Jefferson county had a total of 1,370 milk cows, producing 578,660 gallons of whole milk per year.

In years past the county had several bands of sheep, but at the present time, only 3,150 sheep are listed on the county assessor's records, compared to 22,750 beef animals.

SOURCES OF WATER SUPPLY

The entire drainage area of Jefferson County consists of creeks and rivers that are either directly or indirectly tributaries of the Missouri River. On the north and west, Jefferson County is bounded by mountains which form the Continental Divide. Along the Eastern boundary are the Elkhorn Mountains which taper down to low brush and grass covered foothills. The southern part is an open alluvial flood plain belonging to the Jefferson River and its tributaries.

The Jefferson River is the largest stream in the county and forms the southern boundary. Two large ditches, the Fish Creek Ditch and the Jefferson Canal, tap the river at Parson's Bridge and irrigate an extensive area on the north and west side of the river. Several private ditches divert water from the river as it flows east toward the Missouri.

Fish Creek is the first of four main tributaries of the Jefferson River contributing water for irrigation in the county. Only a few private ditches divert water from Fish Creek above its confluence with the Jefferson River. Fish Creek was adjudicated in Jefferson County, but most of the water rights are used in Silver Bow and Madison Counties.

The next main tributary of the Jefferson River is Pipestone Creek and its tributary, Little Pipestone Creek. From Pipestone Creek the Pipestone Ditch is furnished water from Delmoe Lake for irrigation of the bench land on both sides of the creek. The Delmoe Lake Reservoir stores all the surplus flood water of Pipestone Creek and is the main source of water supply for the Pipestone Ditch Company. Both Pipestone Creek and Little Pipestone Creek are adjudicated.

Whitetail Deer Creek is the next tributary flowing into Jefferson River and with its main tributary Little Whitetail or Cottonwood Creek, drains a sizeable area north of Whitehall. Headwaters of this drainage starts on the east side of the Continental Divide and from the south slope of Bull Mountain. A privately owned storage reservoir on Little Whitetail Creek supplies water exclusively to the Whitetail Water Users' Association. All of the water from Whitetail Deer Creek is used by Whitetail Ditch Company and private ditch systems. Whitetail Deer Creek and its tributaries have been adjudicated.

The largest tributary to the Jefferson River in the county is the Boulder River. Its main tributaries consisting of Bison Creek, Basin Creek, Cataract Creek, Muskrat Creek, Little Boulder River, Elkhorn Creek, Cottonwood Creek and number of large springs, form a major drainage in the county. All the streams except Elkhorn Creek, Cottonwood Creek and the Little Boulder River have their headwaters on the Continental Divide and are the largest contributors of the water flowing in the Boulder River. The Boulder River has not been adjudicated, but several ditches have been adjudicated that divert from it. Muskrat Creek and tributaries, McCarty Creek and Elkhorn Creek, are the only adjudicated tributaries of the Boulder River.

Two small streams, Corral Gulch and Farrow Gulch, which are tributaries to Spokane Creek, furnish water for a small area in the northeast corner of the county. These creeks drain from a small part of the Elkhorn Mountains and provide water for about 100 acres of land.

The last drainage, Prickly Pear Creek, flows north out of the county to its confluence with the Missouri River in Lewis and Clark County. Its tributaries of Spring Creek, Dutchman Creek, Warm Springs Creek, Clancy Creek, Lump Gulch and McClellan Creek furnish very little water for irrigation within Jefferson County. Prickly Pear Creek and its tributaries have been adjudicated but most of the water rights are now used in Lewis and Clark County.

STREAM GAGING STATIONS

The United States Geological Survey carries on the work of measuring stream flows in cooperation with funds supplied by the State and several Federal agencies. The results are published yearly in book form. The data given below on maximum, minimum and average flows covers the period from the beginning of measurements through the year 1950. The water year begins October 1 and ends September 30 of the following year. Storage reservoirs that regulate stream flows at some of the stations given below are Lima Reservoir (built 1902) Ruby Reservoir (1938) and Whitetail (built about 1914). Where diversions for irrigation above the gage are shown, the acreages given are estimates and will not necessarily agree with the final results of the Water Resources Survey.

The following are equivalents useful in converting from one unit of measurement to another:

- (a) In Montana, one cubic foot per second equals 40 miner's inches.
- (b) One acre foot is the amount of water required to cover an acre one foot deep.
- (c) One cubic foot per second will nearly equal two acre feet (1.983) in 24 hours.
- (d) A flow of 100 miner's inches will equal five acre feet in 24 hours.
- (e) One miner's inch flowing continuously for 30 days will cover one acre $1\frac{1}{2}$ feet deep.

All the stream gaging that has been done in Jefferson County is as follows:

Big Pipestone Creek Near Whitehall

The gage was on the left bank of the creek five miles west of Whitehall and one mile upstream from Little Pipestone Creek. The drainage area has not been measured. Records are available from October 13, 1910, through September, 1911. A staff gage was used. The total runoff for the water year was 15.3 cfs or 11,100 acre feet. The maximum flow was 87 cfs (June 9, 1911) and the minimum 0.5 cfs (several days in August and September, 1911). There were diversions above the gage for irrigation of about 1,000 acres.

Little Pipestone Creek Near Whitehall

The gage was located on the right bank of the creek nine miles west of Whitehall and about 500 feet downstream from Radar Creek. The drainage area has not been measured. Records are available from May, 1935, through September, 1940. A staff gage was used prior to October 1, 1938, and a staff gage and sharp crested weir were used afterward. The annual runoff has varied from 1,280 acre feet to 4,090 acre feet. The maximum discharge was 175 cfs (July 1, 1938) and the minimum 0.5 cfs (several times). The readings were affected by diversions above the gage to irrigate about 250 acres.

Little Whitetail Creek Near Whitehall

The gage is located four miles below the Whitetail Reservoir and twelve miles northwest of Whitehall. The drainage area has not been measured. Records are available from November, 1949, through September, 1950. The gage used was a water-stage recorder. The maximum monthly discharge for June was 2,320 acre feet, and the minimum, 102 acre feet in February, 1950. The maximum flow was 96 cfs (May 24, 1950) and the minimum 1.4 cfs (December 4, 1949). There are no diversions above the gage for irrigation but there is regulation of the stream at the Whitetail Reservoir.

Whitetail (Deer) Creek Near Whitehall

The gage was located seven miles north of Whitehall or three miles upstream from the mouth of the creek. The drainage area has not been measured. Records are available from March 7 to September 22, 1911. A staff gage was used. The runoff for these seven months was 1,580 acre feet. The maximum discharge observed was 12 cfs (April 28, June 3 and 9) and the minimum was 0.6 cfs for several times during the period. There was no regulation above the gage but there were diversions for the irrigation of about 500 acres.

Whitetail (Deer) Creek at Whitehall

The gage was located on a county road bridge at the town of Whitehall two miles above the mouth of the creek. The drainage area has not been measured. Records are available from March 19 through June, 1911. The runoff for the 3½ months of record was 6,970 acre feet. The maximum flow was 125 cfs (April 27) and the minimum 0.6 cfs (July 16). There were diversions above the gage for the irrigation of about 2,000 acres.

Rock Creek Tributary to Boulder River Near Bernice

The gage was located eight miles west of Bernice and one-eighth mile upstream from the mouth of the creek. The drainage area has not been measured. Records are available from April 18 to September 12, 1936. A staff gage was used. The maximum discharge was 60 cfs (May 10-13) and the minimum 0.0 (August 30). There was one small diversion for irrigation above the station.

Boulder River Above Rock Creek Near Basin

The gage is located twelve miles west of Basin, one-half mile upstream from Rock Creek and two miles upstream from Thunderbolt Creek. The drainage area has not been measured. From April 18 to September 12, 1936, a staff gage was used at another station one-quarter mile downstream. At the present station a water-stage recorder was installed on June 25, 1946. Records are available at the present station from October, 1937, through September, 1950. The maximum discharge recorded was 582 cfs (May 19, 1948) and the minimum 0.6 cfs (August 28 to September 1, 1936; January 29 to February 3, 1950). The annual runoff has varied during the four water years from 4,910 acre feet to 13,330 acre feet, the mean being 8,365 acre feet. There are no regulations or diversions above the gage.

Boulder River at Basin

The gage was on the left bank of the stream at the town of Basin one-half mile upstream from Basin Creek and one and one-half miles upstream from Cataract Creek. The drainage area is 219 square miles. Records are available from February 26, 1921, through September, 1923. A chain gage was used. The maximum discharge was 1,390 cfs (May 21, 1922) and the minimum 7.6 cfs (March 26, 1922). The annual runoff for the water year 1921-22 was 99,500 acre feet and for the following year, 57,200 acre feet. There was no regulation above the gage but there were diversions for the irrigation of approximately 600 acres.

Boulder River Near Basin

The gage was located on the left bank one and one-half miles east of Basin and just downstream from the mouth of Cataract Creek. The drainage area has not been measured. Fragmentary records are available from June 6, 1919, to July 22, 1920. A staff gage was used. The maximum discharge was 583 cfs (June 19, 1920) and the minimum 0.6 cfs (July 4-6, 1919). There was no regulation above the gage but there were diversions for the irrigation of about 600 acres.

Muskrat Creek Near Boulder

The gage was located six miles northeast of Boulder or 1,000 feet upstream from the Boulder Nursery. The drainage area has not been measured. Records are available from May, 1912, to September 24, 1914. A staff gage and rectangular sharp crested weir were used. The only full water year shows a total flow of 2,870 acre feet. The maximum discharge was 42 cfs (June 1, 1914) and the minimum was 0.8 cfs (March 24-27; April 1-4, 1913; and April 10, 1914). There were no regulations or diversions above the gage.

Boulder River Near Boulder

The gage was located at a highway bridge two miles east of Boulder and one-half mile downstream from Muskrat Creek. The drainage area has not been measured. Records are available from April, 1929, through December, 1933; and then from March, 1934, through September, 1945. The gage was a water-stage recorder. For the thirteen full water years of record the average annual flow has been 77,630 acre feet with a maximum of 153,200 acre feet (1948) and a minimum of 37,490 acre feet (1935). The maximum discharge was 2,620 cfs (May 22, 1948) and the minimum 0.0 (July 15-17, and 21, 1931). There were diversions above the gage for the irrigation of about 3,500 acres.

North Fork of Little Boulder River Near Boulder

The gage was located on the right bank of the stream about 500 feet upstream from the highway bridge, three miles southwest of Boulder or one-eighth mile upstream from the mouth of the creek. The drainage area has not been measured. Records are available from May, 1926, through September, 1927. The discharge for the one complete water year was 6,130 acre feet. The maximum flow was 36.5 cfs (July 8, 1926) and the minimum 0.6 cfs (July 30, August 2, 1946). There were no diversions or regulations above the gage.

Jefferson River at Sappington

The gage is located at the highway bridge one mile northeast of Sappington and five and one-half miles upstream from Willow Creek. The drainage area above the gage is 8,980 square miles. The present gage is a water-stage recorder which was installed August 16, 1938. Prior to September 9, 1896, a staff gage was used, and from September 17, 1896, to December 31, 1905, a chain gage was used at the railroad bridge one and one-fourth miles upstream. Records are available from November 1894, to August, 1896 (gage heights only); and September, 1896, to December 31, 1905; and August, 1938, through September, 1950. The average annual discharge for the twenty-one water years of record was 1,593,900 acre feet. The maximum discharge was 21,000 cfs (June 23, 1899) and the minimum 134 cfs (August 12, 1940). There are diversions above the gage for the irrigation of about 345,000 acres. The records are also affected by the regulation of the Lima and Ruby River Reservoirs.

Dutchman Creek Near Alhambra

The gage was located two and one-half miles south of Alhambra or three-quarters of a mile upstream from the mouth of the creek. The drainage area is 11.2 square miles. Records are available from July 27, 1921, through December, 1924. A staff gage was used. The annual discharge for the three full water years of record has varied from a minimum of 1,730 acre feet to a maximum of 4,220 acre feet, the average being 2,853 acre feet. The maximum discharge was 38 cfs (June 14, 1922) and the minimum 0.5 cfs (September 3, 4, 1924). There were several small diversions for irrigation above the station.

Warm Springs Creek at Alhambra

The gage was located thirty feet below the bridge at the Alhambra Hotel or one-eighth mile upstream from the mouth of the creek. The drainage area is 18.7 square miles. Records are available from July, 1921, through September, 1924. A staff gage was used. The flow has varied for the three full water years of record from a maximum of 8,510 acre feet to a minimum of 3,500 acre feet, the average being 5,363 acre feet. The maximum discharge was 71 cfs (June 17, 1922) and the minimum 1.6 cfs (December 6-11, 1922). There were several small diversions above the station.

Clancy Creek at Clancy

The gage was located just above the old highway crossing at Clancy and one-quarter mile upstream from the mouth of the creek. The drainage area is 33.4 square miles. Records are available from July, 1921, through December, 1923. A staff gage was used. The annual flow for the two full water years of record was 7,360 acre feet and 4,440 acre feet. The maximum discharge was 61 cfs (June 7, 8, 1923) and the minimum 1.0 cfs (September 4, 1923). There were several small diversions above the station.

Lump Gulch at Foley's Ranch Near Clancy

The gage was located at Foley's Ranch one mile downstream from Buffalo Creek and four miles west of Clancy. The drainage area has not been measured. Records are available from July, 1921, through December, 1924. A staff gage was used. The total annual

flow for the three full water years of record was 5,510, 5,070 and 4,690 acre feet. The maximum discharge was 67 cfs (June 9, 1922) and the minimum 0.06 cfs (September 4, 1924). Regulation from placer mining operations about three miles upstream caused considerable diurnal fluctuation.

Lump Gulch Creek at Zastrow's Ranch Near Clancy

The gage was located one mile upstream from the mouth of the creek and one and one-quarter miles northwest of Clancy. The drainage area has not been measured. Records are available from July, 1908, through September, 1913. A staff gage was used. The annual discharge for the five full water years of record has varied from a minimum of 6,230 acre feet (1910) to a maximum of 14,300 acre feet (1909) with an average of 8,442 acre feet. The maximum discharge was 106 cfs (June 9, 1909) and the minimum 0.2 cfs (several days in July, 1913). There were several small diversions for irrigation and some regulation from placer mining operations above the gage.

Prickly Pear Creek at Clancy

The gage is located four miles northeast of Clancy, 100 feet upstream from the bridge on U. S. Highway 91 or three and one-half miles downstream from Lump Gulch Creek. The drainage area is 178 square miles. Records are available from July, 1908, through September, 1916; July, 1921, through September 1933; and October, 1945, through September, 1950. A staff gage was used prior to August, 1933. At the present time there is a water-stage recorder. The average annual discharge for the 25 water years of record was 37,380 acre feet. The maximum discharge was 900 cfs (June 9, 1927) and the minimum 4 cfs (January 23, 1946). There are diversions for the irrigation of about 700 acres above the station.

MINING

Jefferson County was the scene of one of the first discoveries of gold in Montana. Mr. Hurlbut and negro companion discovered gold at Montana City in the middle of July, 1862, but this discovery was overshadowed by the discovery at Bannack July 28, 1862. The real influx of prospectors into this area did not start until after the discovery of gold in Last Chance Gulch at Helena on July 14, 1864. By 1875 placer mining was at a low ebb, but revived in the early 30's when dredging was started on Little Prickly Pear Creek. Except for the interruption of World War II, dredging continued until 1948. Lode mining followed soon after the placer discoveries and Gregory and other silver lodes near Wickes were discovered before the close of 1864. The first lead smelter was built at Gregory in 1867. The completion of the Northern Pacific (Montana Central) Railroad to the area in 1883 gave added impetus to lode mining. Of the more famous mines, the Gregory was most active during the early 1880's; the Alta, 1883-1893; the Comet, 1900; and the Minah, 1900-1901. The lead smelter at Wickes was operated from 1883-1893 then operations were transferred to East Helena.

The total production of metals in Jefferson County from 1870 to 1953 inclusive is valued at \$61,741,000 which breaks down as follows: placer gold, \$4,936,000; lode gold, \$11,096,000; sil-

ver, \$44,580,000; copper, \$2,083,000; lead, \$6,785,000; and zinc, \$3,261,000. Credit for the bulk of this production goes to the following mines: Alta, Comet, Elkhorn, Gregory, Minah, Hope-Katie, Ruby and Mt. Washington.

Basin (Cataract), Comet (Amazon), Boulder Districts

These districts include the area tributary to the towns of Basin and Boulder. Lodes were discovered here before 1870 and the district has been more or less active since that time. Total production, exclusive of that from the Comet mine prior to 1904, is estimated at about \$8,000,000 from the Basin district and the Boulder district has produced \$325,000 since 1904.

The area is underlain by quartz monzonite of the Boulder batholith. In the northern and western parts of the district the quartz monzonite is overlain by post-batholithic Tertiary dacite and rhyolite and pre-batholithic late Cretaceous andesite. Ore deposits include placers, lode deposits of late Cretaceous age and lode deposits of Tertiary age. The older lodes are valued chiefly for silver, lead and zinc; and the younger deposits for gold, silver and locally uranium. Some repeatedly opened fissures contain deposits representative of both groups. Zoning from arsenical and tourmalinic lead mineralization to zinc and finally to a lean copper zone in the lower part has been recognized. On Red Rock Creek, west of Basin, occurs a disseminated deposit of gold-bearing pyrite in granite.

Clancy-Alhambra (Hot Springs) District

This district is 10 miles southeast of Helena. Placer mining began in 1865 and lode mining soon after. Mining activity was greatest prior to 1900. Total production to the end of 1928 is estimated at \$3,500,000 chiefly in silver with some gold, lead and copper.

The principal rock is quartz monzonite. Aplitic occurs in dikes and large masses (segregations). Pegmatite and granite porphyry are common and rhyolite is present. Ore deposits include placers as well as lodes of two ages; late Cretaceous or early Tertiary and late Tertiary. The older lodes contain silver and gold with some galena, sphalerite and arsenopyrite. Some deposits contain molybdenite and some tourmaline. The younger lodes are characterized by a chalcedonic quartz gangue which forms conspicuous outcrops. The ore minerals are sulfides of silver, copper, lead, zinc and iron.

Elkhorn District

The Elkhorn mines lie in the Elkhorn Mountains about 10 miles east of Boulder. The principal mine was opened in 1875 and was in continuous production until 1900. Production of the district has been less since 1900 than before that year. Total production to 1930 has been estimated at \$14,000,000 of which about \$1,500,000 was in gold and the remaining value divided into 14,000,000 oz. of silver, 11,000,000 lb. of lead and 1,000,000 lb. of copper. A little zinc has also been produced.

The geology of the region is complex. Highly folded sedimentary rocks ranging in age from Algonkian to Cretaceous have been eroded and in places covered by andesite and latite. Later, the whole series was intruded by quartz monzonite and diorite porphyry. The intruded rocks show the effects of hydrothermal metamorphism.

The ore deposits of the Elkhorn mine consist of replacements in crushed dolomite beneath altered shale found in the saddles of minor folds. The ore shoots are very irregular, but are continuous to a depth of 1,750 feet, pinching out downward. Oxidation is complete in the upper levels and partial oxidation extends to a depth of 2,300 feet. Some 22 different ore minerals have been described from this district. The Dolcoath mine is characterized by bismuth minerals; two other deposits by magnetite associated with garnet and other contact metamorphic silicates.

The district still is thought to hold promise of future production, mainly from large low-grade deposits valued for their gold.

Wickes-Corbin-Gregory (Colorado) District

Wickes is 20 miles south of Helena. Lode mining began in 1864 and has continued up to the present with few interruptions. The most productive period was prior to 1900. Total production, including that from the Comet mine in the eastern part of the Basin-Boulder district, is estimated at \$59,500,000; probably three-fourths of which was in silver and the remainder in gold, lead, copper and zinc. Ore deposits occur in quartz veins comparable in age to the "older group" of the Basin-Boulder district. They occur in andesite, quartz monzonite and aplite which were deposited in fissure or shear zones. The ores carry silver, gold, lead, copper and zinc. Some bog manganese ore has been reported. The ore consists mainly of galena, sphalerite, pyrite, chalcopyrite, tetrahedrite and arsenopyrite, with their oxidation products in a quartz gangue. Calcite and rhodochrosite are found in some mines; Tourmaline is a characteristic mineral in the ore and wall rock.

Minor Districts

The Big Foot-State Creek district, 10 miles south of Boulder, has produced some gold ore from lode mines. The country rock is quartz monzonite.

Buffalo Creek and its tributary, Lump Gulch, have yielded some placer gold.

The Elk Park district, 18 miles northeast of Butte, has numerous prospects, but none of these have become an important producer. Deposits occur as veins cutting quartz monzonite.

The prospects near Homestake 10 miles southeast of Butte have not proved important.

The area drained by McClellan and Mitchell Creeks in northern Jefferson County has yielded gold from both placers and deep mines.

The Pipestone district is about 10 miles west of Whitehall. Ore deposits occur as placers, lodes cutting granite and mineralized zones in brecciated and recemented granite. The lodes have yielded some ore, but brecciated zones have not been productive.

The Whitehall district is 6 miles northeast of Whitehall on and near St. Paul Gulch, in the southern end of the Bull Mountains. Ore deposits occur as lodes or veins in shale, calcareous shale, slate, sandstone and limestone intruded by dikes. Most of the ore is gold-bear-

ing pyrite in quartz. Galena, sphalerite, copper minerals and manganese minerals have been noted in some mines. Portions of some porphyry dikes have been sufficiently mineralized to constitute valuable ore. Strong faulting is present.

Uranium Occurrence in the Basin-Boulder-Clancy Area

Uranium occurs in two types of deposits: (1) Older base-metal veins. (2) Younger gold and silver-bearing chalcedonic quartz veins. The base metal veins contain quartz (clear and smoky), pyrite, arsenopyrite, galena, sphalerite, chalcopyrite, tetrahedrite, ankerite, uraninite (pitchblende) with its alteration products and chalcedonic quartz. The uraninite occurs as thin black seams in fractures or as mammillary coatings and sooty smears on fracture surfaces. The uranium is associated with ankerite, pyrite, chalcopyrite and chalcedonic quartz of the late stage of mineralization. The country rock is silicified with sericitized quartz monzonite and related granitic rocks usually cut by aplite. The siliceous gold-silver veins usually outcrop as "reefs" or prominent ridges. They consist mainly of chalcedonic quartz with minor amounts of pyrite, galena, ruby silver, native silver, uraninite (pitchblende), autunite, metatorbernite, uranophane and gummite. Brown limonite and black manganese oxide are always present in surface or near surface exposures. Uranium minerals occur in lenticular shoots or pods, impregnated with light to dark-grey chalcedonic quartz and commonly show a superimposed reddish-brown color where uranium is present. The ore is usually brecciated and appears to favor a country rock deficient in hornblende.

The Josephine mine, 15 miles north of Basin, is in an aplite vein cutting quartz monzonite. The vein contains quartz, pyrite, galena, arseopyrite and minor chalcopyrite with tourmaline, amphibole, pink quartz, smoky quartz, clay minerals and limonite. The uranium mineral is metatorbernite. The normal potash content of the granite (5 to 6 per cent) appears to account for one-half to two-thirds of the radio-activity of the rock.

The Bullion mine, 2 miles east of Basin, shows small veins in a large shear zone cutting granitic rocks. Metatorbernite occurs with quartz, galena, cerussite, malachite, azurite, chrysocolla, limonite and sphalerite.

The Mountain Queen and Jack, 14 miles south of Boulder, is in a shear zone in quartz monzonite with white quartz, limonite, cerussite, anglesite, pyromorphite and a little metatorbernite.

The Nickelodeon, 3½ miles south of Boulder, is on a vein in quartz monzonite cut by aplite. Vein minerals are quartz, chrysocolla, limonite, tenorite, chalcopyrite, pyrite, molybdenite, powellite and sheelite. Uranium occurs in micaceous yellow-green crystals coating secondary copper minerals.

The Free Enterprise, 2 miles northwest of Boulder, is on a siliceous filling in steeply dipping fracture zones in quartz monzonite and aplite. Ore minerals are galena, pyrite, ruby silver, native silver, molybdenite, arsenopyrite, chalcopyrite, quartz (white, smoky, black and brownish-cherty, tan opal, uraninite, pitchblende, metatorbernite, torbernite, autunite, gummite, zeunerite and uranophane. Limonite and black manganese oxide also are present. Secondary uranium minerals occur in wall rock as well as in the vein.

The Gold Point, 4 miles northwest of Boulder, is on a vein in quartz monzonite cut by aplite dikes. Vein minerals are quartz, galena, pyrite, chalcopyrite, chrysocolla, limonite, cerussite and some metatorbernite.

The Beavertown Ranch, 5 miles south of Jefferson City, is on a narrow vein in quartz monzonite intruded by aplite. The vein consists of vuggy quartz, limonite, secondary copper minerals and a little metatorbernite.

The Hinman Group (King Solomon Ridge) near Clancy is in siliceous veins cutting silicified granitic rocks. The vein is mainly dark grey to black chalcedonic quartz. Metatorbernite, autunite and other secondary uranium minerals occur as coatings on fractures and disseminations in wall rock. Traces of galena and pyrite are present.

The Liverpool, 2 miles north of Clancy, is on veins in a vertical shear zone cutting quartz monzonite. Course grained quartz, grey chalcedonic quartz, pink ankerite (weathers brown), calcite, pyrite, arsenopyrite, galena and sphalerite, with some tetrahedrite, argentite, uraninite and pitchblende occur.

The President group and Haynes property near Alhambra is in siliceous reefs in fractures in quartz monzonite and related rocks. Uranium is associated with grey chalcedonic quartz as uraninite, autunite, metatorbernite, uranophane, rutherfordine and zeunerite. A little pyrite and galena is present.

The King Solomon, 2½ miles west of Clancy, is in narrow slabs of high-grade silver ore in a wide shear zone cutting quartz monzonite intruded by aplite and dacite porphyry dikes. Vein matter is galena, sphalerite, tetrahedrite with some molybdenite, minor pyrite in chalcedonic quartz brecciated and recemented by siderite. Radio-activity is weak.

SOIL CONSERVATION DISTRICTS

A Soil Conservation District is a legal subdivision of the State, established by the farm and ranch owners and operators, which permits group action in dealing with the problems in soil erosion, moisture conservation, soil fertility and land use.

The Montana State Soil Conservation District Law was passed by the 26th General Assembly on February 28, 1939, and gives the authority for organizing Soil Conservation Districts within the State. Under provisions of the Law, no district can be formed unless the people want it, nor unless they register this want; first by petition and later by a favorable vote of at least 65 per cent of the qualified voters in the proposed district. The law also provides for the formation of a State Soil Conservation Committee, which assists in the organization of districts and also in securing cooperation from State and Federal agencies.

The main governing body of a Soil Conservation District is the board of five supervisors who are elected by the people of the District. This board is empowered by law to study the conservation problems of the district and to formulate programs to deal with these problems. This Board may call upon local, State and Federal agencies to assist in executing

the district's program. By applying to the Board of Supervisors, farmers and ranchers may obtain such technical assistance as the District may have without expense to the operator. The use of other facilities, such as earth-moving equipment, owned, leased or contracted for by the districts, are made available at rates fixed by the Board of Supervisors.

In the State, at the present time, there are 59 Soil Conservation Districts organized and 22 Cooperative Grazing Districts receiving technical assistance from the Soil Conservation Service in conducting conservation programs.

Three Soil Conservation Districts have been organized in Jefferson County. The northern part of the county lying north of a line between Townships 6 and 7 North is included in the Lewis and Clark Soil Conservation District with headquarters at Helena. Jefferson County has approximately 109,000 acres of private land contained in the Lewis & Clark Soil Conservation District. There are approximately 40 operators with about 9,000 acres of cropland, 2,800 of it irrigated and 100,000 acres of rangeland.

The Three Rivers Soil Conservation District, headquartered at Three Forks, has the area of Jefferson County lying east of a line between Ranges 2 and 3 West to the county line at Township 7 North. This area has approximately 106,500 acres with about 30,000 acres of cropland, 5,000 of it irrigated and 75,500 acres of rangeland.

The Jefferson Valley Soil Conservation District contains the balance of the land in Jefferson County. It contains 363,060 acres of agricultural land in 299 operating units. The remaining land within the district is Federally owned and administered by the Bureau of Land Management and Forest Service. Approximately 43,000 acres are irrigated by diversions of creeks, North and South Boulder and the Jefferson River.

The governing bodies of the Districts have signed memorandums of understanding with the U. S. Soil Conservation Service and the State Extension Service to provide technical assistance and educational assistance. Farmers installing conservation practices on their land may receive cost sharing through the Agricultural Conservation Program administered by the Agricultural Stabilization and Conservation Office. Soil and water conservation loans are available through the Farmers Home Administration.

The governing bodies have developed district programs and work plans. Problems within the districts vary but the annual plans stress guidance in proper land use and the development of sound conservation measures on these lands.

The majority of the work completed to date consists of the development and control of irrigation water. Approximately 1,200 acres of new land have been brought under irrigation in the Jefferson Valley Soil Conservation District with assistance of the Soil Conservation Service. About 1,250 acres of land have been leveled for more efficient application of water. The district has put emphasis on improved pastures and management of ranges, crop rotation, weed control along with irrigation, drainage, land leveling and other structural practices. Several large groups have been assisted with irrigation, drainage and erosion control problems.

The Soil Conservation District supervisors have been sponsoring annual conservation day programs. The districts, with the help of county agents, Forest Service and Soil Conservation Service have held tours on range management, erosion control, irrigation practices, forestry, soils and fertility management for school children, ranchers, teachers, Boy Scouts and others. The district furnishes transportation to Conservation Camp for 4-H members each year.

Much has been done to improve and develop land and to conserve natural resources through the efforts of these districts and cooperating agencies. People realize more each year the need for community action to conserve water, soil and vegetation for future generations.

NATIONAL FORESTS

Portions of both the Helena and the Deer Lodge National Forests are located in Jefferson County. The net national forest land area in the county is as follows: Deer Lodge National Forest, 351,723 acres; Helena National Forest, 103,763 acres, having a combined total of 455,486 acres.

The land is located within five ranger districts, with the district forest rangers stationed at Butte, Boulder, Helena, Townsend and Whitehall. District rangers are responsible for administration, management and protection of the national forest resources of their districts.

Lands of the Helena National Forest in Jefferson County drain north into Prickly Pear Creek, east into Beaver Creek and Crow Creek, all of which flow into the Missouri River. On the Deer Lodge National Forest, the Boulder River, Whitetail Creek and Pipestone Creek drain most of the area into the Jefferson River.

Topography of the national forest land is rough to rugged, varying in elevation from 5,000 to 9,400 feet. Most soils are of granite origin and are easily eroded. Soils in some narrow mountain meadows are black loam and quite productive. The steep slopes and granitic soils of the area require careful resources management to keep the watershed stable and to prevent active erosion and siltation.

Annual precipitation varies from 11 inches on Whitetail Creek to approximately 35 inches on the Continental Divide at the headwaters of the Boulder River. Run off is heaviest the last of May or first of June, when warm weather causes increased snowmelt. Infiltration and delayed water storage in the soil is dependent upon the management of the vegetation and use of the resources.

More than half the national forest land of Jefferson County is covered with Lodgepole Pine timber. Douglas Fir, Spruce and Ponderosa Pine are also present in smaller quantities. Much of the pine forest was cut off prior to 1910 and is now mainly young stands of second growth. Most grasslands are composed of native fescue and wheatgrass bunch grasses, which produce sustained crops of excellent forage when moderately grazed. Both the timber and grassland types make excellent watershed cover under proper use and management.

Placer and lode mining operations over the national forest lands for the past 85 years have contributed to considerable soil disturbance, erosion siltation and stream bed scouring. Placer diggings have disrupted many stream channels on both the Deer Lodge and Helena National Forests in Jefferson County. There is very little control of mining operations to protect the watershed under existing laws.

Proper road location and good road construction standards are essential to keep sedimentation and soil erosion to a minimum. Special use permits are now required before anyone constructs a road on national forest land. Road locations must be approved by the Forest Service. As a rule, sustained road grades up to six per cent and trail grades up to twelve per cent keep sedimentation and erosion to a minimum. The Forest Service is informing ranchers, timber operators and miners of the road policy on national forest lands to get their help in better road locations.

The condition of the watershed on national forest land in Jefferson County in general is very good. There are a few scattered areas where overgrazing by domestic livestock occurred before control was initiated and some steep south and west slopes where overuse by big game occurs in winter and spring. Action is being taken to again establish litter and vegetative cover on such areas. Control of big game numbers is handled by the State Fish and Game Department.

Damage to the watershed could result from forest fires, tree insects and disease, improper timber cutting, poor mining operations, poor location and steep grades on roads and trails, poor construction of reservoir dams, over-grazing by domestic livestock and excessive spring and winter grazing by big game animals on south and west slopes. Any of the above hazards can result in excessive run off, decreased infiltration, less delayed water storage in the soil, soil erosion, sedimentation and stream side scouring.

Multiple resource use to benefit the most people, now and in the future, is the object of national forest administration. Water production is dominant and the timber, wildlife, recreation and grazing uses are subordinate to watershed management. The demand on all resources is increasing and this increases the intensity of resource management.

The first objective of national forest administration is to insure the maximum sustained flow of good quality water. Water from national forest land in Jefferson County is initially used for ranch irrigation. Practically all water from the Boulder River, Whitetail Creek and Pipestone Creek is used for irrigation during the last of June and first of July. There are many possibilities on national forest land to construct dams to impound the snowmelt for summer use. Such reservoirs may be constructed after applicants receive a Forest Service special use permit. Three special use reservoirs impound approximately 14,000 acre feet at present on the Whitehall Range District.

Timber stands are to be managed to protect the watershed cover and keep the land producing timber for harvest. This requires close supervision to insure proper location of logging roads, slash disposal, timber stand improvement work to increase the quantity and quality of timber, proper cutting methods to insure another tree crop, work to prevent soil erosion by revegetation and water diversion and administration of the sales business to pro-

tect the public interest. The timber stands will soon be in greater demand for lumber, pulp-wood and power poles. Establishment of timber processing plants in local forests is imminent. Present use does not equal the possible sustained timber yield.

Grazing of domestic livestock contributes substantially to the local economy, as 115 ranchers hold national forest grazing permits in Jefferson County. In managing national forest ranges, it is planned that approximately 60 per cent of the forage volume will be left to provide ground litter to protect the watershed. Moderate range use increase infiltration, insures good soil health and improves forage plant vigor and density. Preference grazing permits are issued only for the number of livestock which can safely be grazed year after year without damaging the watershed.

The demand for national forest recreation is increasing each year. No charge is made for recreational use of the forests in Jefferson County, although the value to the public is great. About 60,000 persons made recreation use of the forests of Jefferson County in 1954. Considerable benefit is derived by business as a result of hunting, fishing, camping and other forest recreation. Benefits to individuals using the forests cannot be valued in dollars. The whole national forest area is used by recreationists and there are nine improved campgrounds and picnic areas in Jefferson County.

Of recent years the national forest revenue from timber sales, grazing and land use have exceeded the cost of administration and protection. One-fourth of all receipts are returned to the counties in which national forests are located for use of schools and roads. In addition, ten per cent of the receipts are returned to the forests for roads and trails. The remainder is deposited in the Federal Treasury.

Big game populations have been on the increase for several years. Overuse of the big game winter and spring range results in severe erosion of the south and west slopes where snow depth is lightest. The State Fish and Game Department has noticed this condition and has established either sex deer seasons and/or more liberal seasons on elk to permit hunters to harvest somewhat near the increase. However, on some areas the winter forage for big game has been so overgrazed that continued and increased heavy harvest of the big game numbers will be advisable.

**ESTIMATE OF NATIONAL FOREST RESOURCE USE
IN JEFFERSON COUNTY**

GRAZING USE—1955

Forest	No. Paid Grazing Permits	No. Cattle Under Paid Permit	No. Sheep Under Paid Permit
Helena	43	2,076	2,000
Deer Lodge	72	5,978	1,000
Totals	115	8,054	3,000

Big Game Estimates and Use—1954

Forest	No. Deer	No. Elk	No. Moose	No. Big Game Hunter-Days
Helena	2,600	450	20	1,500
Deer Lodge	3,500	1,100	60	5,500
Totals	6,100	1,550	80	7,000

Estimate of Recreation Use—1954

Forest	No. Day Visits by Campers & Picnickers	No. Other Recreation Visits Excluding thru Travelers
Helena	5,000	6,500
Deer Lodge	33,000	13,500
Totals	38,000	20,000

Estimate of Timber Resource

Forest	Est. Volume of Mature Timber—All Species	Est. of Probable Annual Sustained Yield
Helena	40,000 MBM	2,000 MBM
Deer Lodge	400,000 MBM	5,900 MBM
Totals	440,000 MBM	7,900 MBM

Water use is most important, but no estimate is available.

**SUMMARY OF IRRIGATED LAND BY RIVER BASINS
IN THE FOLLOWING COUNTIES COMPLETED TO DATE**

Big Horn, Broadwater, Carbon, Custer, Deer Lodge, Gallatin, Golden Valley, Jefferson, Madison, Meagher, Musselshell, Park, Rosebud, Silver Bow, Stillwater, Sweet Grass, Treasure, Wheatland and Yellowstone

RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Missouri River Drainage Basin			
*Missouri River	46,273	11,918	58,191
Jefferson River	61,291	9,713	71,004
Beaverhead River	40,771	6,076	46,847
Big Hole River	23,775	1,950	25,725
Madison River	39,445	7,660	47,105
Gallatin River	111,914	21,097	133,011
Smith River	30,304	18,398	48,702
Musselshell River	64,789	57,870	122,659
Grand Total Missouri River Basin	418.562	134.682	553.244
Yellowstone River Drainage Basin			
Yellowstone River	299,053	96,088	395,141
Stillwater River	27,489	16,403	43,892
Clarks Fork River	91,768	24,195	115,963
Big Horn River	65,395	25,579	90,974
Tongue River	22,137	7,479	29,616
Powder River	8,264	1,804	10,068
Grand Total Yellowstone River Basin	514.106	171.548	685.554
Columbia River Drainage Basin			
Clark Fork (Deer Lodge, Hellgate) River	15,636	1,438	17,074
Grand Total Columbia River Basin	15.636	1.438	17.074
Grand Total in the Counties Completed to Date	948.304	307.668	1,255.972

*Names of streams indented on the left hand margin indicate that they are tributaries of the first stream named above which is not indented.

IRRIGATION SUMMARY OF JEFFERSON COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
*Missouri River	0	0	0
Jefferson River	7,091	910	8,001
Fish Creek	608	0	608
Slough (29, 1N - 4W)	7	0	7
Piedmont Slough	10	5	15
Spring Creek	0	0	0
Vendome Gulch Creek	0	0	0
Poison Springs	3	0	3
Mud Spring	6	0	6
Sump (15, 1N - 4W)	3	4	7
Makowski Spring	4	0	4
McKeown Gulch Creek	9	0	9
Jefferson Slough	33	98	131
Pipestone Creek	2,963	352	3,315
South Fork Pipestone Creek	94	0	94
Dry Creek	3	12	15
Little Pipestone Creek	667	13	680
North Fork Little Pipestone Creek	27	0	27
Rader Creek	35	0	35
Cold Spring	20	0	20
Colbert Creek	40	0	40
Drain Ditch	20	0	20
Sump (4, 1N - 4W)	6	0	6
Well (4, 1N - 4W)	1	0	1
Total Pipestone Creek and Tributaries	3,876	377	4,253
Whitetail Deer Creek	1,596	416	2,012
Big Foot Creek	0	62	62
Dearborn Canyon Creek	0	0	0
Pony (Faulkner) Springs	50	0	50
Fitches (Fitz) Canyon Creek	40	0	40
Little Whitetail (Cottonwood) Creek	578	80	658
Sump (3, 1N - 4W)	130	0	130
Total Whitetail Deer Creek and Tributaries	2,394	558	2,952
Boulder River	6,957	419	7,376
Lowland Creek	0	43	43

*Names of streams indented on the left hand margin indicate that they are tributaries of the first stream named above which is not indented.

IRRIGATION SUMMARY OF JEFFERSON COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Boulder River (continued)			
Unnamed Creek (34, 5N - 7W)	0	14	14
Barts Creek	0	3	3
Olson Gulch Creek	45	0	45
Mormon Gulch Creek	0	21	21
Bison Creek	85	0	85
Fourth of July Creek	211	0	211
Johnson Gulch Creek	39	0	39
Jones Gulch Creek	18	33	51
Waste Water (24, 4N - 7W)	0	22	22
Unnamed Creek (14, 4N-7W)	99	0	99
Unnamed Springs	119	0	119
San Pablo (Ball Canyon) Creek	46	0	46
Unnamed Springs (11, 4N - 7W)	23	0	23
Nez Perce Creek	170	0	170
Unnamed Springs (1, 4N - 7W)	30	0	30
Strozzi Springs	294	0	294
Unnamed Springs (36, 5N - 7W)	74	0	74
Sheep Gulch (Big Gulch, Larson) Creek	102	0	102
Unnamed Springs (31, 5N - 6W)	116	0	116
Quarry (Big Poplar) Creek	5	0	5
Certain Stream (Wilder Creek)	16	0	16
Bear (Gulch) Creek	5	0	5
Unnamed Springs (23, 6N - 6W)	4	0	4
Red Rock Creek	17	18	35
Basin Creek	9	0	9
Cataract Creek	13	0	13
Big Limber Gulch Creek	3	0	3
Galena Gulch Creek	0	4	4
Muskrat Creek	1,031	42	1,073
Wood Creek	3	0	3
Rawhide Creek	117	0	117
Amazon Creek	68	0	68
Waste & Seepage (21, 28, 6N - 4W)	35	0	35
Unnamed Creek (10, 6N - 4W)	0	42	42
McCarthy (McCarty) Creek	133	44	177
Little Boulder River	23	0	23
Beaver Creek	30	0	30
Killiam Spring	1	0	1
Big Gulch Creek	4	0	4
Elkhorn Creek	995	253	1,248
Clark Creek	36	0	36

IRRIGATION SUMMARY OF JEFFERSON COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN

	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Boulder River (continued)			
Dry Creek	0	248	248
Quinn Canyon Creek	20	0	20
Dunn's Canyon Creek	70	0	70
Cottonwood Creek	186	0	186
Cold Springs	175	13	188
Little Creek	0	14	14
Warm Spring	18	14	32
Total Boulder River and Tributaries	11,445	1,247	12,692
Unnamed Creek	3	0	3
Quaking Asp Creek	55	0	55
Milligan Canyon Creek	10	0	10
Total Jefferson River and Tributaries	25,557	3,199	28,756
Spokane Creek	0	0	0
Spring Gulch Creek	0	0	0
Farrow (Dobler Gulch) Creek	56	0	56
Mitchell Gulch Creek	5	4	9
Corral Gulch Creek	58	0	58
Prickly Pear Creek	28	3	31
Beavertown (Beaver) Creek	36	4	40
Troy Creek	0	5	5
Spring Creek	15	11	26
Homestake Creek	24	0	24
Comet Creek	0	0	0
Unnamed Spring Creek (22, 7N - 4W)	11	0	11
Dutchman Creek	27	6	33
Warm Springs Creek	0	21	21
Badger Creek	0	2	2
Turkey (Rattlesnake) Creek	0	4	4
Clancy Creek	90	0	90
North Fork Clancy (Quartz) Creek	18	0	18
Lump Gulch Creek	143	0	143
North Fork Lump Gulch (Buffalo) Creek	0	10	10
Travis Creek	12	0	12
Little Buffalo Creek	4	0	4
Johnson Spring	2	0	2
Jackson Creek	35	0	35
Clark Creek	20	0	20

IRRIGATION SUMMARY OF JEFFERSON COUNTY BY RIVER BASINS

MISSOURI RIVER BASIN		Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Prickly Pear Creek (continued)				
Squaw Creek		12	0	12
Well (1, 9N - 3W)		12	0	12
McClellan Creek		103	27	130
Ice Pond (N.P. Ry.)		12	0	12
Total Prickly Pear Creek and Tributaries		723	97	820
Total Missouri River and Tributaries		26,280	3,296	29,576

FISH CREEK DITCH COMPANY

HISTORY

The Fish Creek Ditch Company was first incorporated on October 22, 1885, for a period of twenty years and in 1905 this company reincorporated for another twenty year period. The last renewal of the ditch company's incorporation was made on October 22, 1925, for a term of forty years existence and will expire October 22, 1965.

On June 6, 1896, the Fish Creek Ditch Company made an amendment to their articles of incorporation, declaring that the capital stock of the company was to be assessable. No other changes, alterations or amendments have been made during the ditch company's corporate existence.

The capital stock of the Fish Creek Ditch Company amounts to \$5,000 and is divided into sixty shares, having a par value of Eighty-three Dollars & Thirty-three and One-third cents each. All of the original sixty shares of stock have been sold and are active under the present ditch system.

There are two other canal systems associated with the Fish Creek Ditch Company. The first one is the Jefferson Canal which uses the same headgate and about one mile of the Fish Creek Ditch. From this point the Jefferson Canal branches off and operates its own canal system. An agreement between these two ditch companies requires the Jefferson Canal to make payment for the use of the headgate and the first mile of the ditch. The other ditch connected with the Fish Creek Ditch Company and built at the same time, is the Pleasant Valley Ditch. This ditch is operated as a separate ditch system only insofar as operation and maintenance is concerned. The water users under the Pleasant Valley Ditch must own stock and pay regular operation and maintenance charges to the Fish Creek Ditch Company in addition to their own ditch assessments.

PRESENT STATISTICS

Location: The Fish Creek Ditch diverts water from the north bank of the Jefferson River in the NW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 14, Township 1 South, Range 5 West. About one mile from the point of diversion in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 11, Township 1 South, Range 4 West the old channel of Fish Creek is used and maintained as a carrier for the water of the Fish Creek Ditch.

The Pleasant Valley Ditch diverts from the Fish Creek Channel in the NW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 1, Township 1 South, Range 5 West. Both ditches follow a northerly direction, supplying water for irrigation in Sections 1, 11, 12, 13 and 14 in Township 1 South, Range 5 West; Sections 6 and 7 in Township 1 South, Range 4 West; and Sections 2, 4, 8, 9, 17, 18, 19, 20, 28, 29, 30, 31 and 32 in Township 1 North, Range 4 West.

Length and Capacity of Canal: Total length of the Fish Creek Ditch is five and three-eighths miles, with an initial carrying capacity of approximately 200 second feet. The Pleasant Valley Ditch extends for an additional 6 $\frac{1}{2}$ miles, making a combined total length of the ditch system 11 $\frac{7}{8}$ miles long.

Operation and Maintenance: Under the Fish Creek Ditch a regular O. & M. charge of \$12.00 per share of stock owned is made each year. Over-payment for operation and maintenance during any particular year is placed in a "reserve fund" and credited to the stockholder whenever additional repair costs on the ditch exceeds the regular \$12.00 assessment. All the water users in the Pleasant Valley Ditch must be share holders in the Fish Creek Ditch Company in order to obtain their water supply. Assessments for O. & M. on the Pleasant Valley Ditch vary from year to year and are in addition to the water charges made to the Fish Creek Ditch Company. One share of stock in the Fish Creek Ditch Company is equivalent to 50 miner's inches of water.

Present Users: The 60 shares of stock in the Fish Creek Ditch are proportioned as follows: Thirty-four shares (seventeen hundred miner's inches) are owned in various amounts by 17 water users under the ditch; twenty-six shares (thirteen hundred miner's inches) are held by 21 water users under the Pleasant Valley Ditch.

Acreage Irrigated: In 1955, there were 2,204 acres irrigated by the Fish Creek Ditch (including the Pleasant Valley Ditch), with 668 acres potentially irrigable under the ditch system.

WATER RIGHT DATA

Only one water right is claimed and used by the Fish Creek Ditch Company during their seventy years of operation. This right consists of the following pertinent data: Appropriated April 25, 1885, from the Jefferson River by N. W. Elmer and Horace Welch 3,000 miner's inches of water. This filing is recorded as of May 2, 1885, in the Jefferson County Courthouse, Boulder, Montana. (Ref.: Book "F," Page 112, Of Water Right Records.)

(See Maps in Part II, Pages 3, 29.)

JEFFERSON CANAL COMPANY

HISTORY

Construction work began on the Jefferson Canal in the year of 1905 and part of the ditch was used during the summer of 1906.

On August 1, 1908, the Jefferson Canal incorporated for a period of twenty years. Seven months after this term of existence had elapsed, the canal company reincorporated on March 18, 1929 for a period of forty years, which will expire on March 18, 1969. The capital stock of the corporation amounts to \$25,000 and is divided into 2,500 shares, having a par value of \$10.00 each. Actual shares of stock subscribed totaled 1,596 shares.

During the year 1907 the Jefferson Canal Company entered into an agreement with the Fish Creek Ditch Company for the joint use of Fish Creek headgate and the first mile of their ditch. However, the operation of the Jefferson Canal and the Fish Creek Ditch are entirely independent of each other.

In 1921 an Extension Canal was built from the Jefferson Canal which furnished water for irrigation of a small area west of Whitehall and along Whitetail Deer Creek. Because of the excessive operation and maintenance costs and the tremendous water loss in the canal where it passed through the gravelly benches west of Whitehall, the Jefferson Extension Canal was discontinued in 1929. In 1941, the Extension Canal became officially abandoned when the name was changed to the Whitetail Ditch Company.

PRESENT STATISTICS

Location: Point of diversion of the Jefferson Canal is from the north bank of the Jefferson River in the NW $\frac{1}{4}$ SW $\frac{1}{4}$ of Section 14, Township 1 South, Range 5 West. Sharing the same headgate and one mile of the Fish Creek Ditch, the canal branches off at a point in the SE $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 11, Township 1 South, Range 5 West. Following a northerly direction the canal supplies water for irrigation to land in Sections 24, 25 and 36, Township 1 North, Range 5 West; and Sections 2, 3, 4, 5, 6, 7, 8, 9, 18 and 19, Township 1 North, Range 4 West.

Length and Capacity of Canal: The canal is about 8 miles in length from the point where it branches off of the Fish Creek Ditch. An estimated initial carrying capacity for this canal would be in excess of 50 second feet.

Operation and Maintenance: O. & M. charges vary from year to year, but will average about \$1.00 per miner's inch of water carried in the canal over a ten year period.

Present Users: For the year 1955, there were 25 water users having a total of 1,502 miner's inches of water supplied to them through the main canal system. One share of stock in the canal is equal to one miner's inch of water.

Acreage Irrigated: During the year of 1955, 1,166 acres were irrigated from the Jefferson Canal, with 92 acres potentially irrigable under the canal system.

WATER RIGHT DATA

Although there are no actual records to substantiate the exact water rights for the Jefferson Canal, the following appropriated water filing applies to the land under this canal system: Appropriated by J. W. Gilkey and D. F. Riggs, 1200 miner's inches from the Jefferson River as of October 17, 1905. (Ref.: Book I of Water Right Locations, Page 302, Jefferson County Courthouse—Boulder, Montana.)

(See Maps in Part II, Pages 3, 4, 7.)

OLD HALE DITCH COMPANY

HISTORY

The first use of the Old Hale Ditch was made in the year of 1898 by Mary I. Fuller, K. Wilks Hale and Cynthia I. Hale. For over fifty years this ditch operated as a private system, supplying water for the lands of the original owners.

On November 21, 1949, George C. Hale, T. J. Finnegan and Owen K. Davis, as owners of the ditch, formed a corporation under the name of The Old Hale Ditch Company. In addition to these three men, the other stockholders in the company included Orville Jewett, Jay E. Huller, Lester B. Williams, Carl Williams, Hiram Williams, Juanita Davis and Lola Hutchinson. The authorized capital stock of the company consisted of 2,000 shares without any nominal or par value. One share of stock represents one acre of land to be irrigated and each share will entitle the owner to one undivided two-thousandths (1/2,000) interest in the water rights and irrigation system of The Old Hale Ditch Company.

PRESENT STATISTICS

Location: Point of diversion of this ditch is from the north bank of the Jefferson River in SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 23, Township 1 North, Range 1 West. Land irrigated by the ditch in Jefferson County is described as Sections 12, 13, 14, 22, 23, 24 and 27, Township 1 North-Range 1 West. The ditch extends a short distance into Broadwater County irrigating land in Sections 6 and 7, Township 1 North, Range 1 East.

Length and Capacity of Canal: Approximate length of the ditch is seven and one-half miles long with an initial capacity to carry 2,000 miner's inches of water allotted to the system.

Operation and Maintenance: Under this ditch system O. & M. charges are not necessary each year. The actual work of maintaining the ditch is divided and shared by each water user whenever necessary.

Present Users: Water was furnished to ten users in Jefferson County and to one water user in Broadwater County during the summer of 1955.

Acreage Irrigated: In 1955, a total of 1,336 acres were irrigated in Jefferson County, with 29 acres potentially irrigable. In Broadwater County 172 acres were irrigated with no potential irrigable land under the ditch.

WATER RIGHT DATA

The water right used by The Old Hale Ditch Company was filed on and appropriated by the original owners and is as follows: Appropriated by Mary I. Fuller, K. Wilks Hale and Cynthia I. Hale from the Jefferson River 2,000 miner's inches of water, dated May 1, 1905. (Ref.: Book 1, Water Right Locations Page 311, filed in the Jefferson County Courthouse, Boulder, Montana).

(See Map in Part II, page 1)

PIPESTONE DITCH COMPANY

HISTORY

The first use of the Pipestone Ditch was made by Tanjor T. Black and the Whitehall Land and Orchard Company in the year of 1908. Incorporated as the Pipestone Ditch Company, on January 1, 1908, a ditch system was built to irrigate a large area of land north and west of the town of Whitehall. A large part of the land intended for irrigation is still without water, because of the limited water supply in the Pipestone Creek Drainage area.

On March 18, 1929, the Pipestone Ditch Company renewed their articles of incorporation for a period of forty years, which will expire on March 18, 1969. Capital stock of the corporation amounts to \$25,000, to be divided into 25,000 shares of the par value of \$1.00 each. The total amount of shares actually subscribed at the present time is 6,000 shares.

The Pipestone Ditch Company was created for the purpose of constructing an irrigation system, composed of a diversion dam and ditches to divert water from Pipestone Creek. The main source of water supply to the users under the Pipestone Ditch is from the storage reservoir at Delmo Lake. All of the water users in the Pipestone Ditch are members and stockholders in the Pipestone Water Users Association which controls the Delmo Lake storage project. Only 1,100 miner's inches of late priority water from Pipestone Creek belongs to the Pipestone Ditch Company. This amount is insufficient for irrigation of the land under the Pipestone Ditch and it was necessary that the water users in the Pipestone Ditch obtain additional water from the Delmo Lake reservoir.

PRESENT STATISTICS

Location: Point of diversion of the Pipestone Ditch is in the SW $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 20, Township 2 North, Range 5 West. The location of land irrigated under the ditch system is in SW $\frac{1}{4}$ Section 25, S $\frac{1}{2}$ S $\frac{1}{2}$ Section 27, N $\frac{1}{2}$ NW $\frac{1}{4}$ Section 28, NE $\frac{1}{4}$ Section 34 and N $\frac{1}{2}$ Section 35, Township 2 North, Range 5 West; W $\frac{1}{2}$ SW $\frac{1}{4}$ Section 28, SE $\frac{1}{4}$ Section 29, Sections 31, 32 and W $\frac{1}{2}$ Section 33, Township 2 North, Range 4 West; and N $\frac{1}{2}$ NW $\frac{1}{4}$ Section 4, Township 1 North, Range 4 West.

Length and Capacity of Canal: Total length of the Pipestone Ditch is about 9 miles, with an initial capacity of 200 second feet.

Operation and Maintenance: O. & M. charges for this ditch average \$500 per year, which is divided proportionately among the stockholders.

Present Users: There were 11 members of the Pipestone Ditch Company in 1955 using 1,100 miner's inches of water belonging to the ditch. For this water, one share in the ditch company is equal to .183 miner's inches. In addition, these 11 water users have 1,650 shares of stock in the Pipestone Water Users' Association (Delmo Lake). These shares are equivalent to about 2,800 acre feet of water at 1.75 acre feet per share. This water is also carried through the Pipestone Ditch.

Acreage Irrigated: In 1955, there were 1,177 acres irrigated from the Pipestone Ditch with 181 acres irrigable under the ditch system.

WATER RIGHT DATA

In the Decree of Pipestone Creek Case No. 1870, the Pipestone Ditch Company was decreed 800 miner's inches as of the priority date September 13, 1907 and 300 miner's inches as of the priority date May 6, 1910 from Pipestone Creek. (Ref.: Case No. 1870 filed and recorded in Jefferson County Court House, Boulder, Montana).

(See Maps in Part II, Pages 3, 7, 8).

PIPESTONE WATER USERS' ASSOCIATION, (INCORPORATED)

HISTORY

The early history of the Pipestone Water Users' Association began in 1912 when the Jefferson Land and Irrigation Company acquired title to two mining claims in the Deer Lodge National Forest for the location of a storage reservoir. A Forest Service permit was obtained and the reservoir was constructed in 1913-14. The dam consisted of a hydraulic fill structure with a concrete core wall. The fill is 342 feet long, 71 feet high and has a top width of 45 feet. From the dam water is conveyed 6 miles down the Channel of Pipestone Creek to the Pipestone Land and Irrigation Co. Canal. The Canal was 20 miles long and designed to irrigate 6,000 acres of the Pipestone Bench, situated between Pipestone and Fish Creeks. In 1922, the gross area to be irrigated was reduced to 4,000 acres and by 1941 only 2,000 acres were irrigated by the Canal system.

The stock-holders of the Jefferson Land and Irrigation Co. were original promoters of the project in 1914. This group in 1919 changed its name and incorporated as "the Pipestone Reservoir and Canal Co." Lands under the project during the years 1915-17 sold for an average price of \$100.00 per acre. By 1921 most of the land had become delinquent for taxes and water assessments.

On May 10, 1935, the project was transferred to the State Water Conservation Board with the understanding that the Board rebuild the diversion flume and rehabilitate the project. The Board was given an option to purchase the project. During 1935, the first year the Board operated it, 1,919 acre feet of water was delivered.

After operating the project for about 5 years, the State Water Conservation Board found the water supply to be insufficient with no possibility of increasing it from other drainages in the area. Also the cost of rehabilitating the project was not economically feasible, therefore the Water Board turned the project back to the original owners on May 9, 1940.

In 1942, the Pipestone Water Users' Association was formed to acquire by purchase or lease the "Delmoe Lake Reservoir" and all appurtenances and water rights which may pertain thereto. Also to build and construct any other reservoirs necessary for the purposes of the organization.

Articles of Incorporation were drawn up for this Association on September 14, 1942 and required a continual period of existence. Capital stock of the incorporation was \$50,000.00, divided into 2,300 shares of a par value of \$20.00 each. All of the 2,300 shares of stock were subscribed by 16 members of the Association.

The source of water for this project is from the Delmoe Lake Reservoir, located near the head waters of Pipestone Creek. At the reservoir outlet the water is then conveyed to the users' ditch diversions through the channel of Big Pipestone Creek. Water delivery is made at the lake and the Association assumes no responsibility in delivery of the water after it leaves the reservoir outlet.

PRESENT STATISTICS

Location: Delmoe Lake Reservoir is located in S $\frac{1}{2}$ S $\frac{1}{2}$ Section 21, SW $\frac{1}{4}$ Section 22, NW $\frac{1}{4}$ Section 27 and NE $\frac{1}{4}$ Section 28, Township 3 North, Range 6 West. Irrigation of the

land from this storage project is located in SE $\frac{1}{4}$ Section 9, S $\frac{1}{2}$ Section 20, SW $\frac{1}{4}$ Section 25, S $\frac{1}{2}$ Section 27, S $\frac{1}{2}$ S $\frac{1}{2}$ Section 28, Section 33, NW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 34 and N $\frac{1}{2}$ Section 35, Township 2 North, Range 5 West; W $\frac{1}{2}$ SW $\frac{1}{4}$ Section 28, SE $\frac{1}{4}$ Section 29, Section 31, Section 32 and W $\frac{1}{2}$ Section 33, Township 2 North, Range 4 West; N $\frac{1}{2}$ NW $\frac{1}{4}$ Section 4, Township 1 North, Range 4 West.

Capacity of Reservoir: The maximum capacity of the reservoir is 6,585 acre feet. Storage in the reservoir varies, depending on available water supply of the drainage area above the reservoir. In 1953, one share of stock in this corporation was equivalent to 2 $\frac{1}{2}$ acre feet of stored water and in 1954 one share was equal to 1 $\frac{1}{4}$ acre feet. The average for the last five years is 1 $\frac{3}{4}$ acre feet per share of stock.

Operation and Maintenance: Water charges include O. & M. and are set at a fixed rate of 60 cents per year.

Present Users: Fourteen water users in 1955 subscribed to all the 2,300 shares of stock issued by the Association. Eleven of the users are furnished their water through the Pipestone Ditch and three other users are supplied water through private ditch systems.

Acreage Irrigated: A total of 1,860 acres are irrigated or supplemented with water from the Pipestone Water Users' Association storage reservoir, with 181 acres potentially irrigable.

WATER RIGHT DATA

The water claimed by the Pipestone Water Users' Association was first decreed in the Pipestone Decree, Case No. 1870, dated April 27, 1914 as follows: Decreed to the Jefferson Land Irrigation Company, 7,000 miner's inches or all surplus water of Pipestone Creek, dated May 7, 1910. A later decree of Pipestone Creek, dated December 1, 1939, Case No. 3234, rededuced the same right as follows: To the State of Montana, 7,000 miner's inches of water from Pipestone Creek as of May 7, 1910. (Ref.: Case No. 1870 and Case No. 3234, are recorded in the Jefferson County Courthouse, Boulder, Montana).

(See Maps in Part II, Pages 4, 8).

WHITETAIL DITCH COMPANY

HISTORY

The Whitetail Ditch Company was first incorporated on October 1, 1921, under the name of Jefferson Canal Extension Company. Water was diverted through the Jefferson Canal from the Jefferson River just below the old Parson's Bridge, immediately north of Waterloo in Madison County. From the point of diversion, the canal follows a general northerly direction to a point near Pipestone Creek, two miles west of Whitehall in Sec. 31, T. 2N., R. 4W. At this point, the Jefferson Extension Canal branches off crossing Pipestone Creek and follows a north-easterly direction through the northwest corner of the town of Whitehall. About one mile north of Whitehall, the canal crosses and diverts water from Whitetail Deer Creek, at which point it runs southeasterly for a distance of 4 $\frac{1}{2}$ miles terminating in the vicinity of Sec. 1, T. 1N., R. 4W.

The Jefferson Canal Extension Company incorporated with a capitol stock of \$25,000, divided into 1,000 shares at a par value of \$25.00 each. The term of existence of the corporation was for 40 years and will terminate October 1, 1961.

On May 24, 1941, the Jefferson Canal Extension Company amended its Articles of Corporation and changed its name to the Whitetail Ditch Company. At this time, the Jefferson Extension Canal was discontinued up to Whitetail Deer Creek due to excessive maintenance cost and the high water loss in transporting the water through the canal system.

PRESENT STATISTICS

Location: Point of diversion of the Whitetail Ditch is from the west bank of Whitetail Deer Creek in NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 28, T. 2N., R. 4W. Land irrigated under the ditch is located in Sections 33, 34 and 35, T. 2N., R. 4W., and Sections 1, 2 and 3, T. 1N., R. 4W.

Length and Capacity of Canal: The initial capacity of the ditch is approximately 25 second feet and has a total length of 4 $\frac{1}{2}$ miles.

Operation and Maintenance: Average cost per year for O. & M. has been about \$1.00 per share, one share equivalent to one miner's inch of water. During the year of 1955, 569 shares were subscribed to in the ditch company, divided among eleven water users.

Acreage Irrigated: In 1955, there were 520 acres irrigated under the ditch system with 30 acres potentially irrigable.

WATER RIGHT DATA

The water rights now claimed and used by the Whitetail Ditch Company were decreed in the Whitetail Deer Creek Decree, Case number 1862 and are as follows: 353 Miner's Inches, decreed to Chas. J. Pruett; 35 Miner's Inches, decreed to C. J. Cottingham; 35 Miner's Inches, decreed to G. H. and M. P. Martius; 20 Miner's Inches, decreed to Mary Noble King; 20 Miner's Inches, decreed to W. A. Stith; 7 Miner's Inches, decreed to Thomas P. Green; 28 Miner's Inches, decreed to John and Kate Huffman, all having the priority date of 12-3-08; and 70 Miner's Inches, of the 170 inch right decreed to the Whitehall Land and Orchard Company, Inc.—dated 9-12-02, totaling 568 Miner's Inches of water for the Whitetail Ditch Company. In addition to the above water rights, the ditch company buys 400 acre-feet from the Whitetail Water Users Association, but this additional supply is not always available every year. The late priority of the water rights used by the Whitetail Ditch Company provide water only during the high water period of the stream flow year. Therefore, a water shortage occurs immediately after the spring run-off when Whitetail Deer Creek returns to normal flow.

(See Maps in Part II, Pages 3, 7.)

WHITETAIL WATER USERS' ASSOCIATION

HISTORY

This project has had a long and varied career throughout its various stages of development. The project was first initiated in 1910 by T. T. Black when he secured the reservoir site. On July 8, 1918, the Whitetail Irrigation District was formed under the state law and an attempt was made to sell \$200,000 in Bonds to finance construction. The bonds failed to sell. The project proposed to store 10,000 acre feet of water to irrigate 4,000 acres of land.

On March 4, 1920, the Whitetail Irrigation Company was incorporated for \$150,000 and for several years both the District and the Company existed side by side, which were governed by the same personnel, until eventually the District acquired all the Company's interests.

On June 13, 1921, the Company let a contract for partially building the dam. This contract was completed Nov. 15, 1921. The following fall the Company did further work on the dam by forced account.

The Irrigation District cancelled its initial bond issue of \$200,000 and on Sept. 11, 1922, a new bond issue for \$255,000 was authorized. Of this amount, \$114,500 in bonds was paid to the stockholders of the Company.

On May 31, 1944, the Whitetail Water Users' Association became successors in interests to the Whitetail Irrigation District. Among the most important assets acquired by the Whitetail Water Users' Association were the reservoir, ditches, dams, franchise, water rights and other properties. Directors of the new corporation were: E. R. McCall, C. F. Reed, N. D. Root and D. H. McCauley. The amount of capital stock for the corporation was set at \$150,000.00 divided into 1,500 shares, of the par value of \$100.00 each. The stock in the Company was declared to be nonassessable.

PRESENT STATISTICS

Location: The Whitetail reservoir is located in Sections 19, 20, 29 and 30, Township 4 North, Range 5 West and Section 24, Township 4 North, Range 6 West. Water is released from the reservoir and conveyed down the channel of Little Whitetail Creek where it is diverted by private ditches for the irrigation of land in Sections 4, 5, 8, 9, 21 and 28, Township 2 North, Range 4 West.

Capacity of Reservoir: The reservoir has maximum capacity of about 8,000 acre feet, however, this maximum level is very seldom obtained due to the limited water supply from the drainage area above the reservoir.

Operation and Maintenance: O. & M. for this project will average about \$300.00 per year and is divided proportionately among four active stockholders in the Association.

Present Users: Only four active stockholders of the Association are using water from the reservoir. These members hold the majority of stock and controlling interest in the corporation. There are 11 other stockholders who hold promotional shares at the time the corporation was formed. Active shares of stock subscribed total 870, with 1 share equal to 1 miner's inch of water. For the last three years the reservoir has been dry by the first of September, thus causing a shortage of water during the fall irrigation season.

Acreage Irrigated: In 1955, only 770 acres were irrigated under the Whitetail Water Users' Association project with 111 acres potentially irrigable.

WATER RIGHT DATA

The water right claimed by the Whitetail Water Users' Association is as follows: Decreed to Tanjor T. Black all surplus water of Little Whitetail Creek as of the date May 7, 1910. (Ref.: Case No. 1862, Whitetail Deer Creek Decree, dated April 22, 1913. Recorded and filed in the Jefferson County Courthouse, Boulder, Montana).

(See Map in Part II, Page 7.)

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record)			DECREED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
MISSOURI RIVER BASIN							
*Missouri River	0	0	0				
Jefferson River	34	78,025	1,950.625				
Black Sulphur Spring	1	50	1.250				
Dry Beaver Pond Creek	1	100	2.500				
Grand View Spring	1	120	3.000				
Red Cloud Spring	1	200	5.000				
Slough	2	600	15.000				
Unnamed Spring	1	1,000	25.000				
Willow Creek	1						
Fish Creek	23	10,465	261.625	2221 ¹	8	1,410	35.25
Little Fish Creek	1						
Unnamed Spring	1	80	2.000				
Mud Springs	1	40	1.000				
Piedmont Slough	2	400	10.000				
Spring Creek	3	1,200	30.000				
Crystal Springs	3	5,090	127.250				
Upper Cedar Spring	1	80	2.000				
Cedar Spring	1	400	10.000				
Cedar Gulch Creek	1	40	1.000				
Vendome Gulch Creek	1	160	4.000				
Marie Spring	1	25	.625				
Beulah Spring	1	50	1.250				
Cedric Spring	1	10	.250				
South Cedric Spring	1	360	.250				
Poison Springs	3	360	9.000				
Alkali Springs	1	150	3.750				
Unnamed Spring	1	40	1.000				
Unnamed Spring	1	2,000	50.000				
Spring Creek	1	100	2.500				
Wade Creek	1	All					
McKeown Gulch Creek	1	100	2.500				
Jefferson Slough	3	1,700	42.500				
Pipestone Creek	41	65,230	1,630.750	3234	9	7,868.70	196.72
				1870	18	3,050.90	76.27
Cuttler Creek	2	40	1.000				
Delmoe Spring	1	50	1.250				
Sage Brush Creek	2	150	3.750				
Spring Creek	4	300	7.500				
Spruce Creek	1	100	2.500				
Tributary of Pipestone Creek	1	100	2.500				
West Branch Pipestone Creek	2	600	15.000				
O'Neil Gulch Creek	1	400	10.000				
Tom Haney (Middle) Creek	4	800	20.000				
North Fork Pipestone Creek	0	0	0				
Branch of North Fork Pipestone Creek	1	500	12.500				
South Fork Pipestone Creek	4	130	3.250				
Beefstraight Creek	4	1,250	31.250	1870	(See Pipestone Creek)		
Halfway Creek	4	1,300	32.500	1870	(See Pipestone Creek)		

*Names of streams indented on the left margin indicate that they are tributaries of the first stream named above which is not indented.

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record)			DECREED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Spire Rock Creek	1	15	.375	1870			
Homestake Creek	13	4,260	106.500				
Whitehorse Creek	2	60	1.500	1870			
Lyon Creek	9	1,990	49.750				
Moose Creek	1	500	12.500				
Holland Canyon Creek	1	200	5.000				
Dry Creek	6	80	2.000				
Central Springs	1	40	1.000				
Northwest Springs	1	40	1.000				
Quaking Asp Spring	2	160	4.000				
Stone Cabin Spring	1	1	.025				
Unnamed Springs	4	290	7.250				
Devil Gate Springs	1	1,000	25.000				
Pole Canyon Creek	5	1,130	28.250				
Tributary of Pole							
Canyon Creek	1	75	1.875				
Dry Creek Spring	1	20	.500				
Cottonwood Springs	1	40	1.000				
Long Springs	1	48	1.200				
Stanley Springs	2	65	1.625				
Little Pipestone Creek	23	10,280	257.000	3234			
				1870			
Highland Branch Little							
Pipestone Creek	1	100	2.500				
Mill Creek	1	300	7.500				
Unnamed Springs	0	0	0	3234			
South Fork Little							
Pipestone Creek	1	100	2.500				
North Fork Little							
Pipestone Creek	2	40,100	1,002.500				
Mud Springs Creek	3	260	6.500				
Rader Creek	4	16,440	411.000	3234			
Unnamed Springs	2	50	1.250				
Fur Gulch Creek	1	1,350	33.750				
Colette Springs	1	40	1.000				
Unnamed Spring	1	—	—				
Horseshoe Bend Spring	1	25	.625				
Upper Friend Springs	1	10	.250				
Lower Friend Springs	1	10	.250				
Unnamed Spring	1	All	—				
Duck Spring	1	50	1.250				
Whitetail Deer Creek	43	174,465	4,361.625	1862	41	3,163	79.075
				2450	1	100	2.50
				2179	2	1,000	25.00
East Fork Whitetail Creek	2	400	10,000				
North Fork Whitetail Creek	1	500	12.500				
South Fork Whitetail Creek	1	500	12.500				
Southwest Branch Whitetail							
Creek	1	200	5.000				
Walker Creek	1	200	5.000				
West Fork Whitetail Creek	3	900	22.500				
Grady Creek	1	50	1.250	1862			
Unnamed Springs	1	50	1.250				
Big Foot Creek	2	130	3.250	1862			
Beaver Creek	5	11,150	278.750				
Branch of Beaver Creek	1	100	2.500				
Hay Canyon Creek	5	370	9.250				

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	No. of Filings	APPROPRIATIONS (Filings of Record)		DECREE RIGHTS			
		Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Poison Spring	1	75	1.875				
Cow Canyon Springs	1	50	1.250				
Pony Canyon Creek	1	30	.750				
Myers Upper Spring	1	50	1.250				
Dearborn Canyon Creek	1	100	2.500				
Pony (Faulkner) Springs	1	100	2.500				
Penny Canyon Springs	1	40	1.000				
Morton Springs	1	1,200	30.000				
Sheep Creek	5	200	5.000				
Fitches (Fitz) Canyon Creek	6	1,100	27.500				
Little Whitetail (Cottonwood) Creek	16	5,685	142.125	1862	(See Whitetail Deer Creek)		
Spring Creek	2	130	3.250				
Grouse Creek	1	100	2.500				
Pesenti Spring	1	10	.250				
Little Cottonwood Creek	0	0	0				
Little Cottonwood Springs	1	80	2.000				
Alkali Springs	2	100	2.500				
Tebay Spring	1	75	1.875				
Stretch Springs	1	.20	.500				
Stager Spring	1	150	3.750				
Unnamed Spring	1	10	.250				
McEwan Spring	1	10	.250				
Sunlight Spring	1	120	3.000				
Doherty Spring	1	10	.250				
Unnamed Spring	1	10	.250				
Miller Springs	5	120	3.000				
McGuire Springs	1	All	—				
Bluebird Spring	1	200	5.000				
Waste	1	All	—				
Boulder River	142	260,634	6,515.850				
Billie Rowlands Spring	1	20	.500				
Boulder Slough	35	2,767	69.175				
Branch of Boulder River	1	100	2.500				
Canyon Creek	2	300	7.500				
Southwest Fork Canyon Creek	1	300	7.500				
Cottonwood Springs	1	50	1.250				
Elk Creek	1	—	—				
Faucy Creek	1	50	1.250				
French Gulch Creek	1	100	2.500				
Gilligham Creek	1	100	2.500				
Gold Spring	2	70	1.750				
Halter Gulch Creek	1	113	2.825				
Hidden Spring	1	32	.800				
Home Creek	1	100	2.500				
John's Gulch Creek	1	200	5.000				
Klondyke Creek	1	100	2.500				
Laggan Spring	1	2,000	50.000				
Lead Creek	1	All	—				
Left Fork Canyon Creek	1	200	5.000				
Lone Butte Spring	1	All	—				
Lost Cabin Gulch Creek	4	420	10.500				
Mattson Gulch Creek	1	All	—				
McArthurs Spring	1	6	.150				

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record)			DECREEDED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Mud Springs	3	250	6.250				
Powder Horn Creek	1	300	7.500				
Roundup Springs	1	100	2.500				
Ryans Gulch Creek	1	All	—				
Sheep Gulch Creek	1	2,196	54.900				
Slumgullion Gulch Creek	1	150	3.750				
Smelter Creek	2	400	10.000				
Smith Spring	3	205	5.125				
Southwest Fork							
Boulder River	2	200	5.000				
Spring Creek	1	1,000	25.000				
Town Creek	2	400	10.000				
Warm Springs Creek	1	All	—				
Waterloo Creek	1	50	1.250				
Weasel Creek	1	All	—				
Unnamed Creeks	6	2,500	62.500				
Unnamed Spring	1	20	.500				
North Branch							
Boulder River	1	500	12.500				
South Fork Boulder River	2	400	10.000				
West Fork Boulder River	1	200	5.000				
Cabin Creek	1	50	1.250				
Indian Creek	8	2,100	52.500				
Carbonate Springs	1	5	.125				
Park Springs	2	750	18.750				
Rock Creek	6	19,500	487.500				
Little Cottonwood Creek	1	100	2.500				
Thunderbolt Creek	7	6,800	170.000				
Boyles Creek	3	450	11.250				
Finn Creek	2	120	3.000				
North Fork Finn Creek	1	40	1.000				
Alta Gulch Creek	2	600	15.000				
Tributary of Alta							
Gulch Creek	1	—	—				
Lowland Creek	13	11,295	282.375				
Cleary and McKunes							
Creek	1	100	2.500				
North Branch							
Lowland Creek	1	500	12.500				
Northeast Branch							
Lowland Creek	1	500	12.500				
Northwest Branch							
Lowland Creek	1	500	12.500				
Ruby Gulch Creek	3	4,048	101.200				
Sawmill Creek	8	5,263	131.575				
Tributary of							
Lowland Creek	1	500	12.500				
Triplet Gulch Creek	2	512	12.800				
Barts Creek	1	100	2.500				
Olson Gulch Creek	—	—	—				
Unnamed Springs	2	80	2.000				
Buffalo Creek	4	1,540	38.500				
Moran Gulch Creek	1	All	—				
Spring Gulch Creek	2	40	1.000				
Kit Carson Gulch Creek	1	300	7.500				
Placer Gulch Creek	1	—	—				
Dry Gulch Creek	1	252	6.300				

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	No. of Filings	APPROPRIATIONS (Filings of Record)		DECREEDED RIGHTS			
		Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Headley (Cluney) Creek	1	80	2.000				
Mormon Gulch Creek	2	60	1.500				
Unnamed Spring	1	60	1.500				
Bison Creek	16	10,285	257.125				
Bull Camp Creek	2	200	5.000				
Burton Gulch Creek	1	200	5.000				
Butcher Gulch Creek	1	500	12.500				
Harvay Gulch Creek	1	500	12.500				
Little Creek	1	400	10.000				
Park Creek	6	1,300	32.500				
Rodoni Creek	1	240	6.000				
Sherman Gulch Creek	1	1,500	37.500				
South Fork							
Nezahena Creek	1	1,000	25.000				
Spruce Creek	3	1,350	33.750				
Alder Gulch Creek	1	50	1.250				
Charles Creek	1	50	1.250				
Unnamed Creek	2	1,700	42.500				
Unnamed Springs	1	200	5.000				
Elgin Dairy Spring	1	40	1.000				
Brockmay's (Smith)							
Gulch	2	40	1.000				
Mikes Spring	1	120	3.000				
Old Sawmill							
Springs Gulch							
Old Sawmill Springs	3	200	5.000				
Fourth of July Creek	6	1,060	26.500				
Summit Creek	2	900	22.500				
Unnamed Spring	1	240	6.000				
Woodchute Spring Creek	3	180	4.500				
Hughes Gulch Creek	3	200	5.000				
Unnamed Springs	4	80	2.000				
Johnson Gulch Creek	2	200	5.000				
Mormon Hill Creek	1	50	1.250				
Lockhart Creek	1	50	1.250				
Canyon Gulch Creek	1	150	3.750				
Jones Gulch Creek	3	550	13.750				
Mill Gulch Creek	1	150	3.750				
Unnamed Creek	1	4	.100				
Unnamed Spring	2	20	.500				
Gagnier Springs	1	12	.300				
Unnamed Spring	1	All					
San Pablo (Ball							
Canyon) Creek	2	130	3.250				
Diablo Creek	1	80	2.000				
Nez Perce Creek	19	28,700	717.500	1283	2	30	.75
Left Fork Nez							
Perce Creek	1	100	2.500				
Southeast Fork Nez							
Perce Creek	1	200	5.000				
South Fork Nez							
Perce Creek	2	1,700	42.500				
Bear Creek	1	160	4.000				
Leppola Creek	1	50	1.250				
Big Gulch Creek	1	120	3.000				
East Fork Big							
Gulch Creek	1	150	3.750				

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record)			DECREE RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Lone Gulch Creek	2	.290	7.250				
Strozzi Springs	1	5	.125				
Strozzi Springs No. 2	1	4	.100	1489	2	All	
Unnamed Springs	3	.130	3.250	1010	1	5	.125
Sheep Gulch Creek	3	360	9.000				
Quarry (Big Poplar)							
Creek	2	400	10,000				
Unnamed Creek	1	200	5,000				
Unnamed Spring	1	3	.075				
Unnamed Creek	1	80	2,000				
Shamrock Gulch Creek	1	2	.050				
Murphy Gulch Creek	1	.102	2.550				
Randalls Gulch Creek	1	.160	4,000				
A Certain Stream (Wilder Creek)	2	586	14,650				
Grays Gulch Creek	1	40	1,000				
Bear Gulch Creek	8	6,496	162,400				
Tributary of Bear Gulch Creek	1	148	3,700				
Red Rock Creek	20	19,150	478.750				
Right Fork Red							
Rock Creek	1	.240	6,000				
Left Fork Red							
Rock Creek	3	800	20,000				
South Fork Red							
Rock Creek	3	3,500	87,500				
Sullivan Creek	4	1,500	37,500				
Unnamed Creek	1	5	.125				
Kleinschmidt Creek	3	300	7,500				
Silver Front Spring	1	50	1,250				
Basin Creek	48	171,988	4,299.700				
Branch of Basin Creek	1	50	1,250				
East Fork of Basin Creek	1	50	1,250				
Eureka Creek	11	55,600	1,390.000				
Left Fork Eureka Creek	1	500	12,500				
North Fork Basin Creek	1	200	5,000				
Talequat Creek	1	300	7,500				
Unnamed Creek	1	200	5,000				
War Eagle Gulch Creek	2	150	3,750				
Wilkinson Creek	1	200	5,000				
Clear Creek	10	6,775	169.375				
Southwest Branch of Clear Creek							
Unnamed Springs	1	50	1,250				
West Fork Clear Creek	3	350	8,750				
John Day Creek	2	550	13,750				
Jimmie Creek	2	3,800	95,000				
Joe Bowers Creek	1	150	3,750				
South Fork Basin Creek	2	1,400	35,000				
Jack Creek	4	2,250	56,250				
North Fork Jack Creek	2	1,280	32,000				
Northeast Fork							

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record)			DECREED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Jack Creek	1	50	1.250				
Right Fork							
Jack Creek	1	1,000	25.000				
Bullion Creek	2	200	5.000				
Unnamed Creek	1	900	22.500				
Haggerty's Gulch Creek	1	85	2.125				
Lily of the West							
Gulch Creek	1	85	2.125				
Spring Gulch Creek	1	100	2.500				
Cataract Creek	52	97,930	2,448.250				
Copeland Creek	1	1,000	25.000				
Grab Gulch Creek	1	—	—				
Rat Cabin Springs	1	10	.250				
Spring Creek	4	4,700	117.500				
North Branch							
Cataract Creek	2	400	10.000				
West Fork							
Cataract Creek	1	100	2.500				
East Branch							
Cataract Creek	4	800	20.000				
Rocker Creek	1	40	1.000				
Snowdrift Creek	3	900	22.500				
Hoodoo Creek	1	1,000	25.000				
King Creek	1	9	.225				
Morgan Gulch Creek	2	300	7.500				
Uncle Sam Creek	10	2,709	67.725				
Deer Creek	1	500	12.500				
Big Limber Gulch Creek	4	500	12.500				
Buttermilk Jim Gulch							
Creek	1	10	.250				
Unnamed Spring	1	10	.250				
Highore Creek	19	4,065	101.625				
Timber Gulch Creek	3	400	10.000				
Tributary of							
Highore Creek	2	330	8.250				
Northwest Branch							
Highore Creek	2	500	12.500				
Bishop Creek	2	350	8.750				
West Fork Bishop							
Creek	2	160	4.000				
Peters Gulch Creek	1	200	5.000				
Boomerang Gulch Creek	1	500	12.500				
Picnic Gulch Creek	2	110	2.750				
Left Fork Boomerang							
Gulch Creek	1	50	1.250				
Galena Gulch Creek	6	1,370	34.250				
Right Fork Galena							
Gulch Creek	2	400	10.000				
Water Gulch Creek	1	200	5.000				
Little Galena Gulch Creek	2	550	13.750				
Unnamed Creek	1	30	.750				
Poore Gulch Creek	1	20	.500				
Unnamed Springs	2	60	1.500				
Wood Chuck Spring	1	100	2.500				
Waste	8	225	5.625				
Cedar Spring	1	10	.250				

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record)			DECREEDED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Creek	1	10	.250				
Antelope Springs	1	25	.625				
Aspen Springs	3	125	3.125				
Cherry Springs	2	65	1.625				
Jefferson Springs	1	25	.625				
Willow Springs	1	10	.250				
Unnamed Spring	6	115	2.875 (Not Given) ²	1	1		.025
Muskrat Creek	19	3,210	80.250	12491	4	620	15.5
				1484			
Dead Horse Gulch Creek	1	All.	—				
Unnamed Spring	1	100	2.500				
Spruce Creek	1	All	—				
Unnamed Spring	1	100	2.500				
Wood Creek	3	175	4.375				
Rawhide Creek	2	100	2.500				
Jones Creek	1		—				
Spencer Creek	7	640	16.000				
Unnamed Spring	1	10	.250				
Amazon Creek	5	230	5.750				
West Fork							
Amazon Creek	0	0	0				
Tributary of West							
Fork Amazon Creek	1	40	1.000				
Griswold Creek	2	100	2.500				
Sloan Gulch Creek	2	200	5.000				
Larson Gulch Creek	1	30	.750				
School House Springs	1	100	2.500				
Spring Creek	4	112	2.800				
McCarthy (McCarty)							
Creek	1	100	2.500 (Not Given) ³	2	100		2.50
Little Boulder River	15	30,824	770.600				
Left Fork Little							
Boulder River	1	All	—				
Right Fork Little							
Boulder River	1	All	—				
South Fork Little							
Boulder River	3	3,500	87.500				
Buffalo Creek	2	200	5.000				
Moose Creek	13	5,540	138.500				
East Fork Moose Creek	1	20	.500				
Middle Fork							
Moose Creek	1	40	1.000				
West Fork Moose Creek	1	40	1.000				
Wilson Creek	3	1,800	45.000				
Elder Creek	1	200	5.000				
North Fork Little							
Boulder River	4	2,580	64.500				
McGinley Creek	3	203	5.075				
Beaver Creek	7	3,800	95.000				
Warm Springs	1	All	—				
Lockey Hot Springs	1	10	.250				
Browns Gulch Creek	0	0	0				
Unnamed Spring	1	50	1.250				
Farnham Creek	4	350	8.750				
Tiger Creek	1	100	2.500				
Unnamed Spring	1	15	.375				
Killiam Spring	1	50	1.250				

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record)			DECREEDED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Spring	1	50	1.250				
McCauleys Gulch Creek	1	100	2.500				
Unnamed Ditch	1	105	2.625				
Big Gulch Creek	2	20	.500				
Phil Smith Springs	1	50	1.250				
Log Gulch Creek	0	0	0				
Unnamed Springs	2	100	2.500				
Elkhorn Creek	26	5,790	144.750	1288	6	810	20.25
				2300	1	200	5.00
A Fork of Elkhorn Creek	2	100	2.500				
Dry Fork of Elkhorn Creek	5	3,170	79.250				
East Branch of Elkhorn Creek	2	1,050	26.250				
Flume Gulch Creek	2	1,000	25.000				
Little East Fork							
Elkhorn Creek	2	300	7.500				
Middle Fork							
Elkhorn Creek	1	150	3.750				
Right Fork							
Elkhorn Creek	3	1,200	30.000				
Unnamed Creek	1	25	.625				
Unnamed Springs	3	200	5.000				
Waste	2	200	5.000				
Slaughterhouse Gulch Creek	2	300	7.500				
Mill Creek	6	1,515	37.875				
Bismark Creek	2	74	1.850				
Queen Gulch Creek	1	200	5.000				
North Fork Queen Gulch Creek	0	0	0				
Leslie Lake	1	400	10.000				
Unnamed Creek	1	240	6.000				
Hobo Gulch Creek	1	400	10.000				
Shady Nook Springs	1	10	.250				
Ballard Spring	2	40	1.000				
Murry Spring No. 1	1	40	1.000				
Murry Spring No. 2	1	40	1.000				
Wood Gulch Creek	1	500	12.500				
Unnamed Spring	1	150	3.750				
Waste	1	200	5.000				
Clark Creek	1	All	—				
Jack Smith Creek	4	1,700	42.500				
Finch Gulch Creek	1	100	2.500				
Dry Creek	15	2,835	70.875	2213	3	650	16.25
West Fork Dry Creek	2	475	11.875				
Hunting Gulch Creek	0	0	0				
Rogers Springs	2	275	6.875				
Quinn Canyon Creek	5	1,100	27.500				
Slough Gulch Springs	1	200	5.000				
Mulvey Gulch Creek	4	675	16.875				
Quaintance Spring No. 1	2	30	.750				
Quaintance Spring No. 2	2	24	.600				
Cabin Gulch Creek	3	4,250	106.250				
Cabin Gulch Spring	7	522	13.050				
Trail Springs Creek	1	150	3.750				
Trail Springs	2	1,100	27.500				

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record)				DECREEDED RIGHTS			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.	
Unnamed Spring	1	50	1.250					
Brady Gulch Creek	3	450	11.250					
Willow Spring Creek	2	200	5.000					
Willow Springs	8	945	23.625	(Not Given) ¹	1	40..	1.00	
Unnamed Spring	1	50	1.250					
Ida Springs	1	75	1.875					
Jack Creek	3	1,400	35.000					
Dunn's Canyon Creek	3	1,000	25.000					
Dunn Springs	1	50	1.250					
Unnamed Springs	1	500	12.500					
Nigger Hollow Creek	0	0	0					
Unnamed Springs	3	205	5.125					
Rock Creek	1	50	1.250					
Unnamed Spring	1	10	.250					
Cottonwood Creek	8	19,000	475.000					
Unnamed Spring	1	200	5.000					
South Fork								
Cottonwood Creek	4	350	8.750					
Flaherty Spring	1	160	4.000					
Huller Spring	1	50	1.250					
Choke Cherry Creek	1	200	5.000					
Berryman Spring	1	20	.500					
Unnamed Springs	1	50	1.250					
Cold Springs	2	1,775	44.375					
Mirey Spring	1	200	5.000					
Little Creek	1	450	11.250					
Conrow Creek	2	40	1.000					
Warm Spring	1	50	1.250					
Unnamed Spring	1	30	.750					
Cottonwood Canyon Creek								
Long Spring Creek	3	137	3.425					
Long Springs	1	30	.750					
Unnamed Spring	1	5	.125					
Minier Spring	1	10	.250					
Unnamed Springs	7	450	11.250					
Cottonwood Gulch Creek	1	40	1.000					
Stanton Gulch Creek	2	20	.500					
Quaking Asp Creek	2	90	2.250					
Quaking Asp Spring	1	50	1.250					
Unnamed Springs	2	70	1.750					
Logan Spring	1	25	.625					
Milligan Canyon Creek	2	200	5.000					
Timber Canyon Creek	0	0	0					
Unnamed Creek	1	50	1.250					
Unnamed Springs	2	320	8.000					
Mud Spring Creek	0	0	0					
Unnamed Spring	2	140	3.500					
Cedar Springs	1	40	1.000					
Shoddy Creek	3	1,160	29.000					
Unnamed Springs	2	60	1.500					
Crow Creek	5	13,500	337.500					
Tizer Creek	8	46,900	1,172.500					
Northwest Fork Tizer Creek	1	1,800	45.000					
Southwest Fork Tizer Creek	1	2,000	50.000					
Glenwood Lake	1	1,000	25.000					
Little Tizer Creek	3	2,500	62.500					
Wilson Creek	8	24,300	607.500					

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	No. of Filings	APPROPRIATIONS (Filings of Record)		DECREE RIGHTS			
		Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
South Fork Crow Creek	2	400	10.000				
Warner Creek	1	200	5.000				
Warm Springs Creek	0	0	0				
Sleepy Hollow Creek	2	160	4.000				
Tipperary Springs	1	100	2.500				
Unnamed Springs	1	200	5.000				
Rattlesnake Creek	3	720	18.000				
Rattlesnake Springs	4	520	13.000				
Unnamed Springs	2	40	1.000				
Spokane Creek	0	0	0				
Spring Gulch Creek	0	0	0				
Farrow (Dobler Gulch)							
Creek	1	50	1.250				
Harlow Creek	1	50	1.250				
Mitchell Gulch Creek	11	950	23.750				
West Branch of							
Mitchell Gulch Creek	1	40	1.000				
Corral Gulch Creek	3	600	15.000				
Unnamed Springs	2	300	7.500				
Prickly Pear Creek	73	51,320	1,283.000	668 ⁶	46	6,134.5	153.36
Ada Gulch Creek	1	75	1.875				
Basin Stage Station							
Canyon Creek	1	All	—				
Branch of Prickley							
Pear Creek	2	50	1.250				
Canyon Creek	3	400	10.000				
Carrol Creek	1	All	—				
Clear Spring	1	50	1.250				
Cold Spring	1	50	1.250				
Deer Gulch Creek	3	250	6.250				
Holt Springs	1	50	1.250				
Left Fork Prickly Pear Creek	1	All	—				
Long Creek	1	10	.250				
Lower Twin Lake	6	13,000	325.000				
Mackenzie Gulch Creek	1	200	5.000				
McCracken Gulch Creek	2	50	1.250				
Mill Creek	1	200	5.000				
Papoose Creek	4	250	6.250				
Picnic Gulch Creek	3	150	3.750				
Pilgrim Creek	1	—	—				
Salt Creek	1	—	—				
Slaughter House Gulch Creek	1	50	1.250				
Three Mile Creek	1	—	—				
Unnamed Spring	1	—	—				
Upper Twin Lake	3	5,000	125.000				
Weasel Creek	3	1,250	31.250				
West Fork Creek	0	0	0	668	(See Prickly Pear Creek)		
Black Canyon Creek	2	350	8.750				
Weimer Creek	1	100	2.500	668	(See Prickly Pear Creek)		
Anderson Creek	13	2,325	58.125	668	(See Prickly Pear Creek)		
West Fork Anderson Creek	1	50	1.250				
Golconda Creek	12	4,350	108.750	668	(See Prickly Pear Creek)		
Branch of Golconda Creek	1	25	.625				
East Fork Golconda Creek	1	100	2.500				
South Fork Golconda Creek	2	125	3.125				
West Fork Golconda Creek	1	50	1.250				
Belcher Creek	2	130	3.250				
Beavertown (Beaver) Creek	7	1,910	47.750	668	(See Prickly Pear Creek)		

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Record)

DECREEED RIGHTS

STREAMS	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Blue Bell Creek	4	215	5.375				
Spring Creek	10	2,080	52,000	668	(See Prickly Pear Creek)		
Hawley Gulch Creek	1	All					
Unnamed Creek	1	100	2,500				
Left Fork Spring Creek	1	All					
Homestake Creek	0	0	0	668	(See Prickly Pear Creek)		
Penn Yan Creek	1	300	7,500				
Comet Creek	3	520	13,000				
Unnamed Spring Creek	1	400	10,000				
Unnamed Creek	1	40	1,000				
Bush Gulch Springs	1	5	.125				
Alta Gulch Creek	3	560	14,000				
Corbin and Gregory Gulch Creek	2	500	12,500				
Unnamed Springs	2	10	.250				
Dutchman Creek	11	2,345	58,625	668	(See Prickly Pear Creek)		
Mud Springs	3	119	2,975				
Wheel Spring	1	100	2,500				
Centennial Gulch Creek	1	4	.100				
Mud Spring Creek	1	30	.750				
Warm Springs Creek	12	1,900	47,500	668	(See Prickly Pear Creek)		
Left Fork Warm Springs Creek	1	50	1,250				
Waste	1	200	5,000				
North Fork Warm Springs Creek	3	840	21,000				
Unnamed Spring	1	2	.050				
Middle Fork Warm Springs Creek	3	475	11,875				
Lava Creek	1	12	.300				
Browns Gulch Creek	2	240	6,000				
Unnamed Springs	2	25	.625				
Badger Creek	2	120	3,000				
Furlong Gulch Creek	1	50	1,250				
Turkey (Rattlesnake) Creek	3	300	7,500				
Kelly Creek	3	300	7,500				
Unnamed Springs	1	10	.250				
Unnamed Creek	1	200	5,000				
Clancy Creek	21	4,900	122,500	668	(See Prickly Pear Creek)		
Crystal Creek	2	350	8,750	668	(See Prickly Pear Creek)		
Haynes Gulch Creek	1	2	.050				
Left Branch Clancy Creek	2	500	12,500				
Middle Fork Clancy Creek	3	550	13,750				
Right Fork Clancy Creek	1	All					
South Fork Clancy Creek	2	700	17,500				
Gregory Gulch Creek	2	All					
Tributary of Gregory Gulch Creek	1	10	.250				
North Fork Clancy (Quartz) Creek	12	4,320	108,000				
North Fork Quartz Creek	1	10	.250				
South Fork Quartz Creek	4	1,800	45,000				
Unnamed Spring	1	100	2,500				
Kents Creek	1	100	2,500				
Lump Gulch Creek	24	8,531	213,275	668	(See Prickly Pear Creek)		
Cincinnati Creek	1	50	1,250				
Lost Creek	1	All		668	(See Prickly Pear Creek)		
Spring Gulch Creek	1	10	.250				

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

STREAMS	APPROPRIATIONS (Filings of Record)			DECREED RIGHTS			
	Filings	(Filings of Inches	Cn. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cn. Ft. Per Sec.
South Fork Lump							
Gulch Creek	3	1,150	28.750				
Tributary of Lump							
Gulch Creek	1	1,000	25.000				
Unnamed Spring	1	50	1.250				
Corral Creek	1	150	3.750				
North Fork Lump Gulch							
(Buffalo) Creek	15	4,960	124.000	668	(See Prickly Pear Creek)		
Travis Creek	8	5,760	144.000				
Go Devil Creek	1	200	5.000				
Whiteman Creek	1	100	2.500				
Blacksmith Creek	1	100	2.500				
Unnamed Springs	3	100	2.500				
Little Buffalo Creek	3	125	3.125	668	(See Prickly Pear Creek)		
West Dutchman Creek	3	176	4.400				
Johnson Springs	1	40	1.000				
Unnamed Springs	2	20	.500				
Strawberry Creek	5	1,050	26.250				
Shingle Creek	2	55	1.375	668	(See Prickly Pear Creek)		
Jackson Creek	7	644	16.100	668	(See Prickly Pear Creek)		
Tributary of Jackson Creek	1	50	1.250				
Hungry Hollow Creek	2	12	.300				
Clark Creek	10	910	22.750	668	(See Prickly Pear Creek)		
Shermans Springs	1	100	2.500				
Unnamed Spring	1	20	.500				
Squaw Creek	0	0	0				
Unnamed Springs	1	15	.375				
Unnamed Creek	1	60	1.500				
Unnamed Springs	2	40	1.000				
McClellan Creek	39	45,000	1,125.000	668	(See Prickly Pear Creek)		
Batchlor Gulch Creek	1	20	.500				
Beaver Dam Gulch Creek	1	200	5.000				
Right Fork McClellan Creek	1	300	7.500				
Tributary of Mill Creek	1	25	.625				
Jackson Creek	6	600	15.000				
Crystal Creek	1	All	—				
Maupin Creek	3	600	15.000				
Warm Springs	1	All	—				
Unnamed Spring	1	50	1.250				
Murphy Spring	1	50	1.250				
Unnamed Springs	2	150	3.750				
Twin Springs	1	15	.375				
Holmes Gulch Creek	15	1,310	32.750				
Tributary of Holmes							
Gulch Creek	1	20	.500				
Butcher Knife Spring	2	22	.550				
Lone Tree Gulch Creek	1	200	5.000				
TOTAL	2039	1,636,955	40,923.875	148	25,183.10	629.575	

¹ Decree for Fish Creek applies to Jefferson and Silver Bow Counties. Number of decrees listed pertain to Jefferson County only.

² Case Number not available. Recorded in Decree Record Book 1, page 574, Jefferson County Courthouse.

³ Case Number not available. Recorded in Decree Record Book "A", page 4, Jefferson County Courthouse.

⁴ Case Number not available. Recorded in Decree Record Book "A", page 174, Jefferson County Courthouse.

⁵ Decree for Prickly Pear Creek applies to Jefferson and Lewis and Clark Counties. Number of Decrees listed pertain to Jefferson County only. Recorded and filed in the Federal Courthouse, Helena, Montana.

WATER RIGHT DATA — JEFFERSON COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

APPROPRIATIONS
(Filings of Record)

DECREED RIGHTS

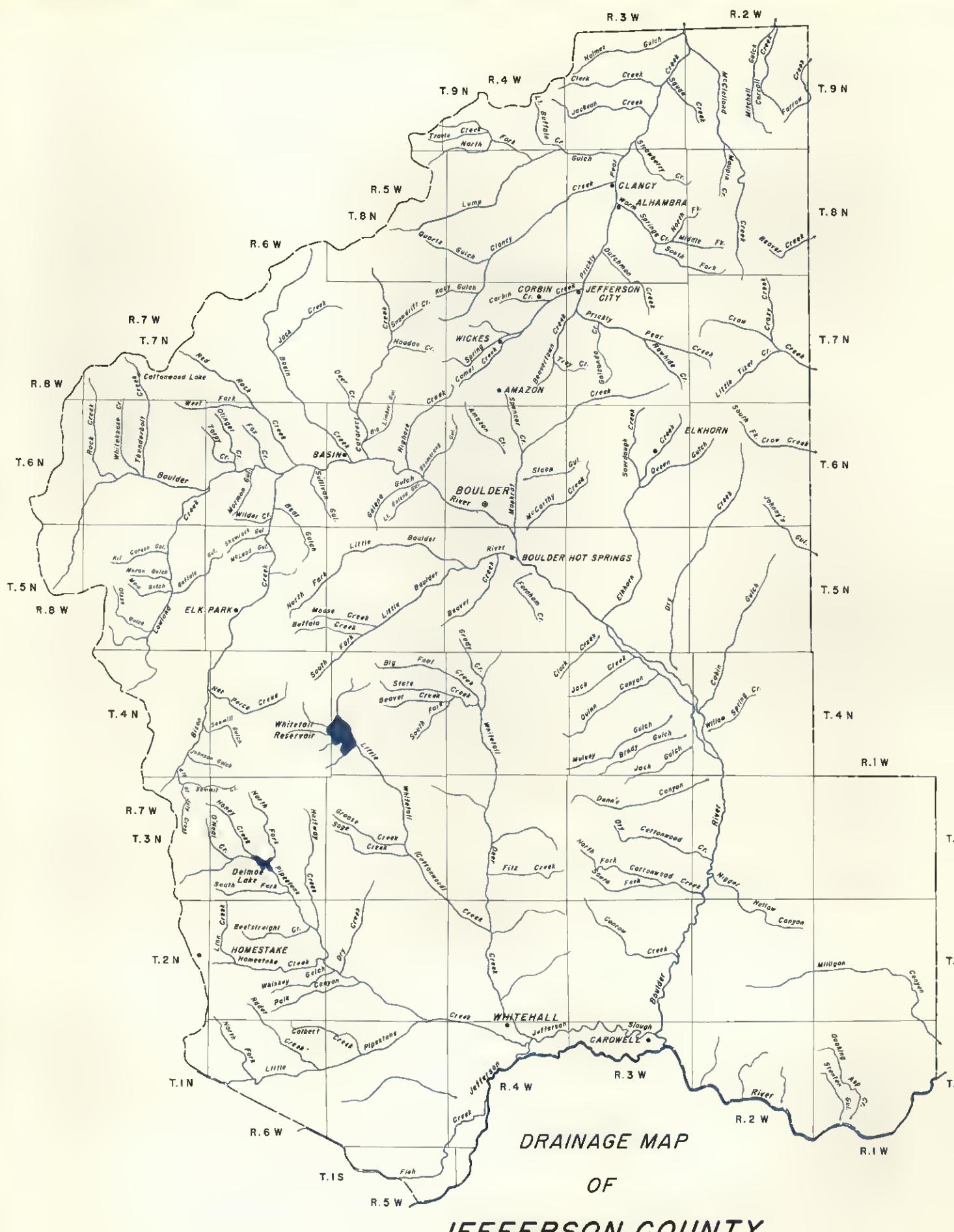
STREAMS	No. of Filings	Miuer's Inches	Cu. Ft. Per Sec.
DRAINAGES IN JEFFERSON COUNTY NOT LOCATED.			
Al Preston Creek	1	500	12,500
Amsee Creek	1	120	3,000
South Branch Amsee Creek	1	80	2,000
Boulder Hill Gulch Creek	1	50	1,250
Butte Creek	3		
Middle Fork Camp Creek	1	300	7,500
Right Fork Caters Creek	1		
Deadwood Creek	2	310	7,750
Eldorado Creek	2	2,000	50,000
Estus Creek	1	200	5,000
Expert Creek	1	800	20,000
Floyd Creek	1	50	1,250
Greyers Gulch Creek	1	126	3,000
Hensley Creek	1	100	2,500
Hotson Creek	1	3	.075
Keen Gulch Creek	1	50	1,250
Kleen Gulch Creek	1	100	2,500
Legal Tender Gulch Creek	1	12	.300
Oregon Gulch Creek	1	All	
Pete Garlands Gulch Creek	1	100	2,500
Prospect Creek	1	25	.625
Seabeck Creek	1	600	15,000
Slocum Creek	1	15	.375
Spring Creek	11	1,940	48,500
Spur Four Gulch Creek	1	20	.500
Staller Gulch Creek	1	10	.250
Sunrise Creek	1	500	12,500
Turner Gulch Creek	1	All	
Tycoon Gulch Creek	2	900	22,500
Big Horn Spring	1	50	1,250
Birth Spring	1	All	
Birlington Spring	1	10	.250
Butts Ranch Springs	1	160	4,000
Coal Gulch Spring	1	5	.125
Crystal Springs	2	13	.325
Day Spring	1	All	
Eureka Spring	1	50	1,250
Fountain Springs	1	All	
Hadley's Spring	1	100	2,500
Homestake Road Spring	1	200	5,000
John Spring	1	150	3,750
Kalahari Spring	1	50	1,250
Lincoln Spring	1	All	
Pickyune Spring	1	All	
Ruby Mountain Springs	1	10	.250
Sage Brush Springs	1	50	1,250
Sandy Hammond Springs	1	100	2,500
Silver Spring	1	All	
Tuttle Warm Springs	1	40	1,000
Summit Lake	3	6,000	150,000
Unnamed Lake	1		
Unnamed Creeks	23	2,295	57,375
Unnamed Springs	69	3,254	81,350
Waste	6	153	3,825
TOTAL	167	21,595	539,875

WATER RESOURCES SURVEY

Jefferson County, Montana

Part II Maps Showing Irrigated Areas

Published by
STATE ENGINEER'S OFFICE
Helena, Montana
June, 1956



JEFFERSON COUNTY

MAP INDEX

Township	Range	Page	Township	Range	Page
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1 North	2 West	1	4 North	7 West	12
1 North	3 West	2	5 North	3 West	16
1 North	4 West	3	5 North	4 West	17
1 North	5 West	4	5 North	6 West	18
1 North	6 West	5	5 North	7 West	19
2 North	2 West	6	6 North	4 West	20
2 North	3 West	6	6 North	5 West	21
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2 North	5 West	8	7 North	3 West	23
3 North	2 West	9	7 North	4 West	23
3 North	3 West	9	8 North	3 West	24
3 North	4 West	10	8 North	4 West	25
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3 North	7 West	12	9 North	3 West	27
4 North	2 West	13	9 North	4 West	28
4 North	3 West	14	1 South	4 West	29
4 North	4 West	15	1 South	5 West	29

MAP SYMBOL INDEX

BOUNDARIES

- COUNTY LINE
- NATIONAL FOREST LINE

DITCHES

- ↙ CANALS OR DITCHES
- DRAIN DITCHES
- PROPOSED DITCHES

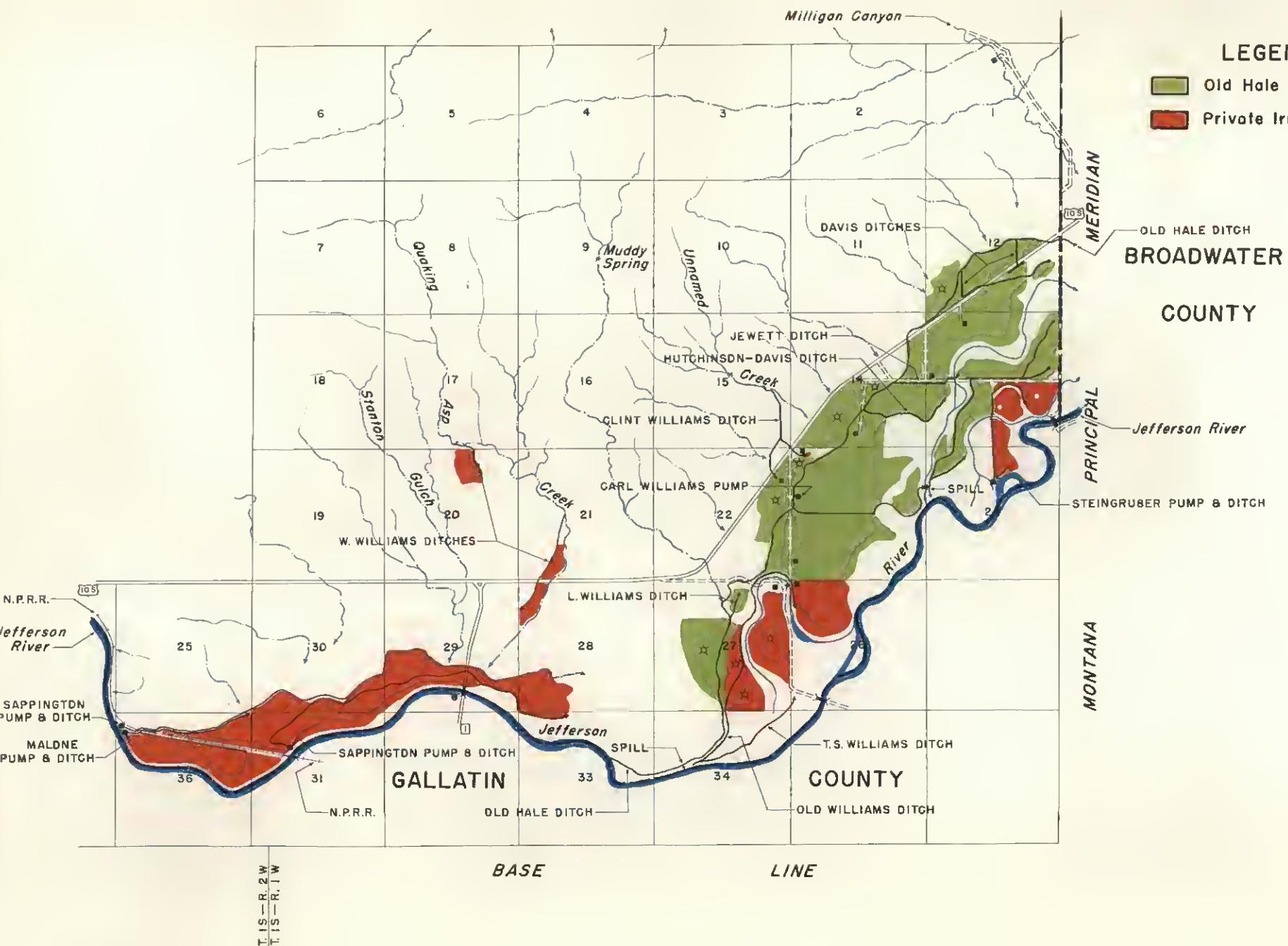
TRANSPORTATION

- == PAVED ROADS
- == UNPAVED ROADS
- +++ RAILROADS
- 10 STATE HIGHWAY
- 89 U.S. HIGHWAY
- ◊ AIRPORT

STRUCTURES & UNITS

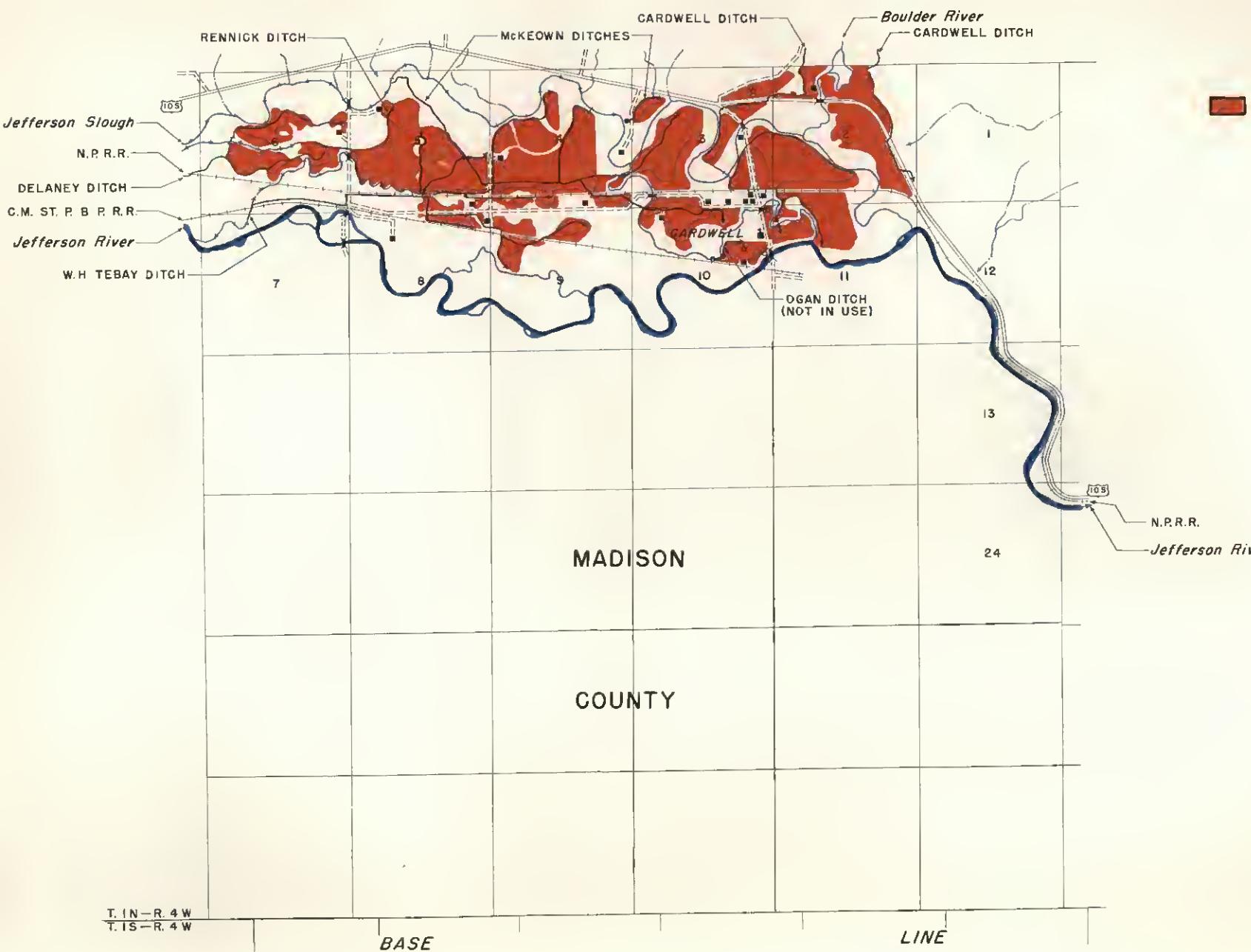
- ＼ DAM
- ↙ DIKE
- ↖ FLUME
- +++ SIPHON
- ↖ SPILL
- ☀ SPRINKLER SYSTEM
- ↖ WEIR
- HH PIPE LINE
- PUMP
- PUMP SITE
- ↙ RESERVOIR
- ⊖ WELL
- +++ NATURAL CARRIER USED AS DITCH
- * SPRING
- ↖ SWAMP
- GAUGING STATION
- POWER PLANT
- STORAGE TANK
- CEMETERY
- FAIRGROUND
- FARM OR RANCH UNIT
- ↑ LOOKOUT STATION
- ↑ RANGER STATION
- ::: RAILROAD TUNNEL
- 1 SCHOOL
- ✗ SHAFT, MINE, OR DRIFT

Twp. 1 NORTH
Rge. 1 & 2 WEST



Twp. 1 NORTH

Rge. 3 WEST

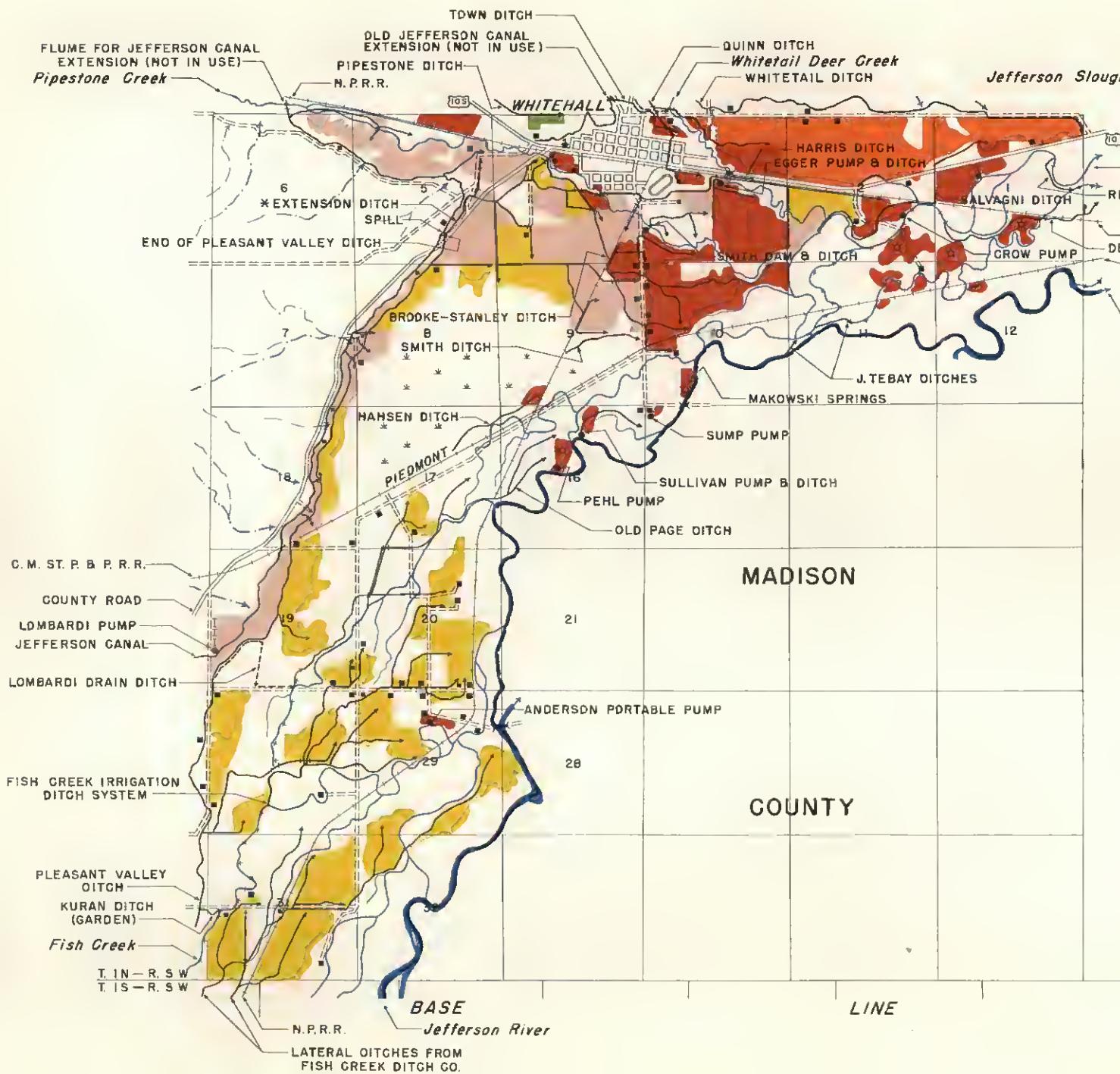


LEGEND

■ Private Irrigation

Twp. 1 NORTH

Rge. 4 WEST

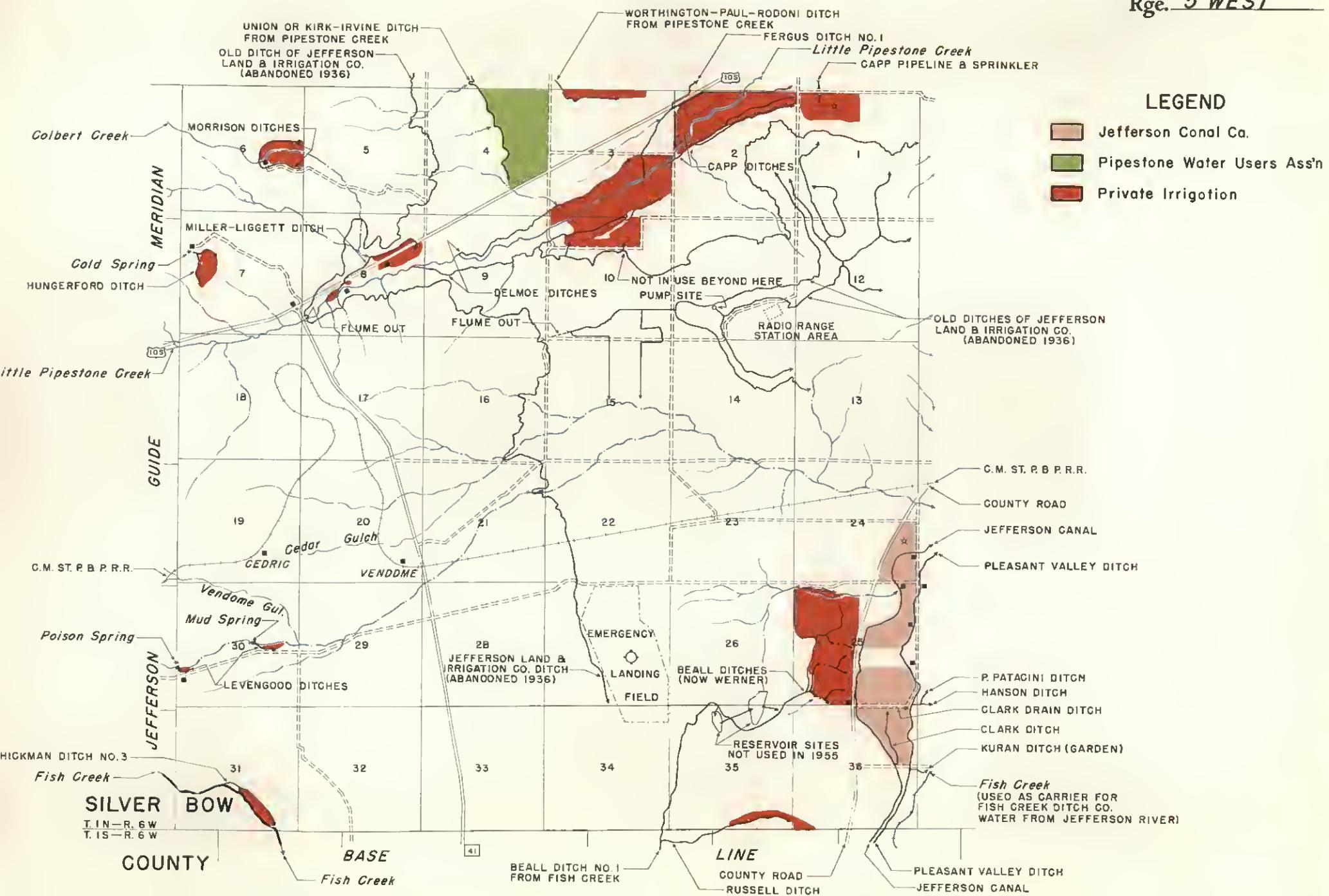


LEGEND

- Fish Creek Ditch Co. (Including Pleasant Valley Ditch)
- Jefferson Canal Co.
- Pipestone Ditch Co. & Pipestone Water Users Ass'n
- Whitetail Ditch Co.
- Private Irrigation

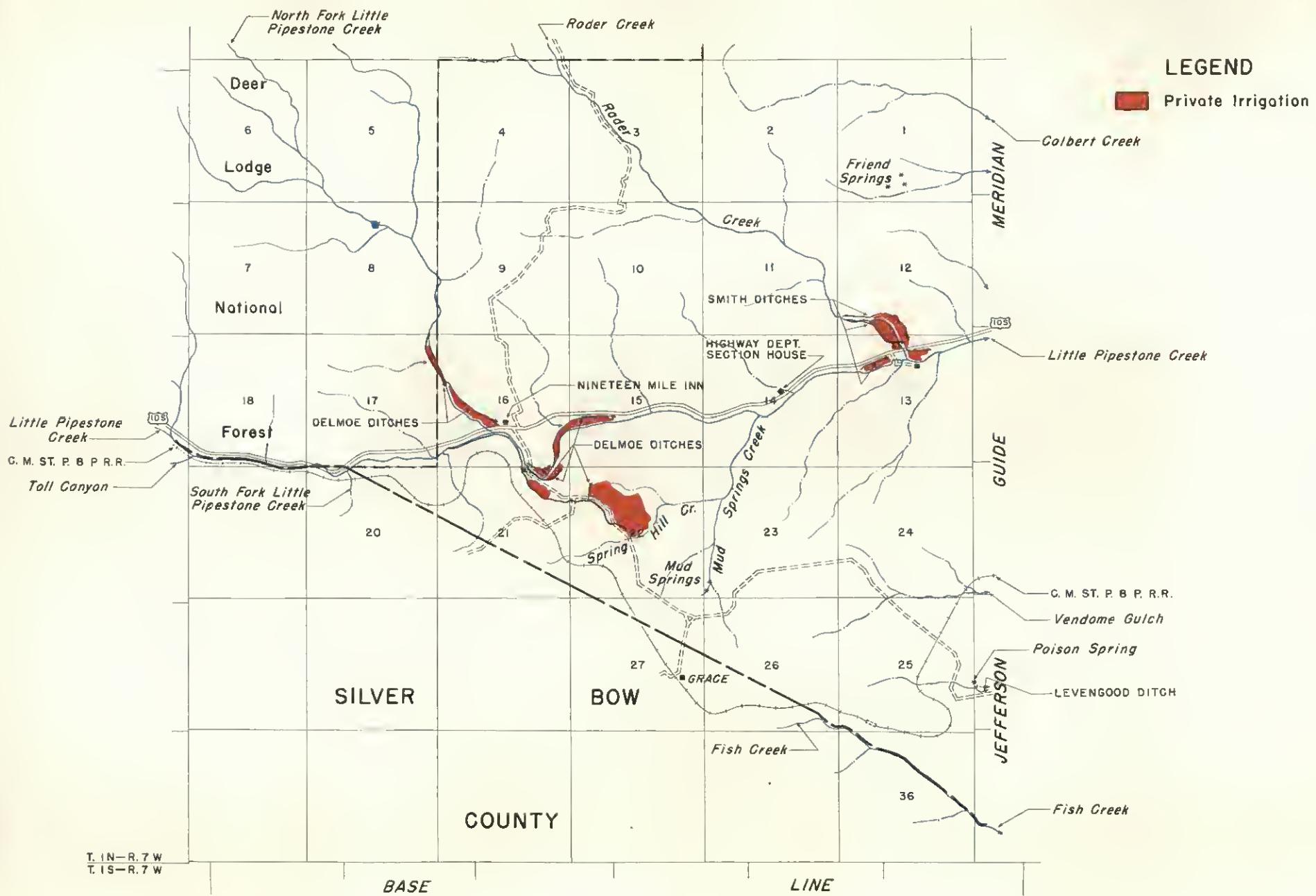
* Private extension ditch carries water from Jefferson Canal, Fish Creek and Pleasant Valley ditches.

Twp. 1 NORTH
Rge. 5 WEST

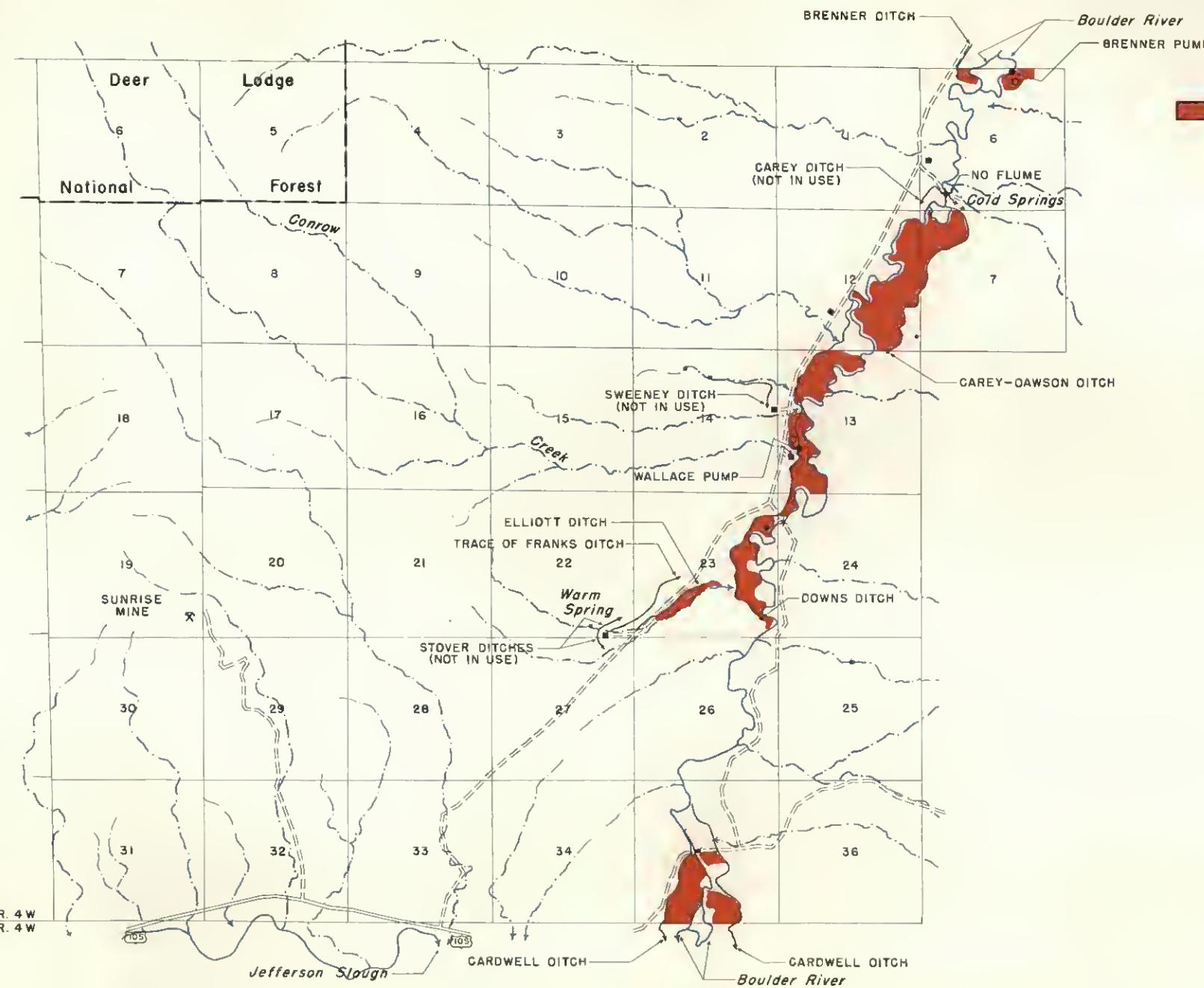


Twp. 1 NORTH

Rge. 6 WEST



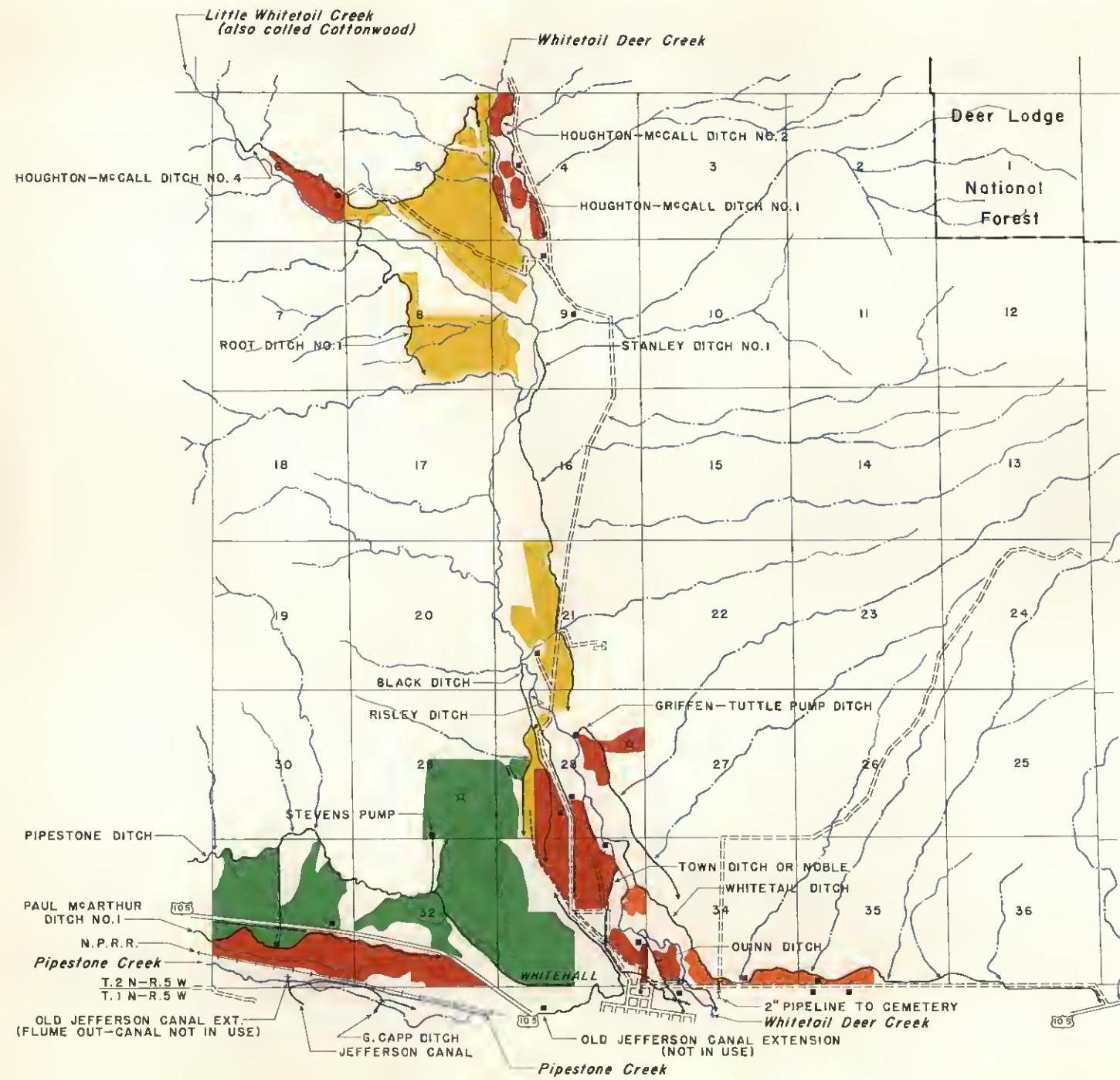
Twp. 2 NORTH
Rge. 2 & 3 WEST



LEGEND

Private Irrigation

Twp. 2 NORTH
Rge. 4 WEST



LEGEND

- Jefferson Canal Co.
- Pipestone Ditch Co.*
- Whitetail Ditch Co.
- Whitetail Water Users Ass'n
- Private Irrigation

* NOTE:

ALL THE WATER USERS IN THE
PIPESTONE DITCH CO. HAVE SHARES
IN THE PIPESTONE WATER USERS ASS'N.

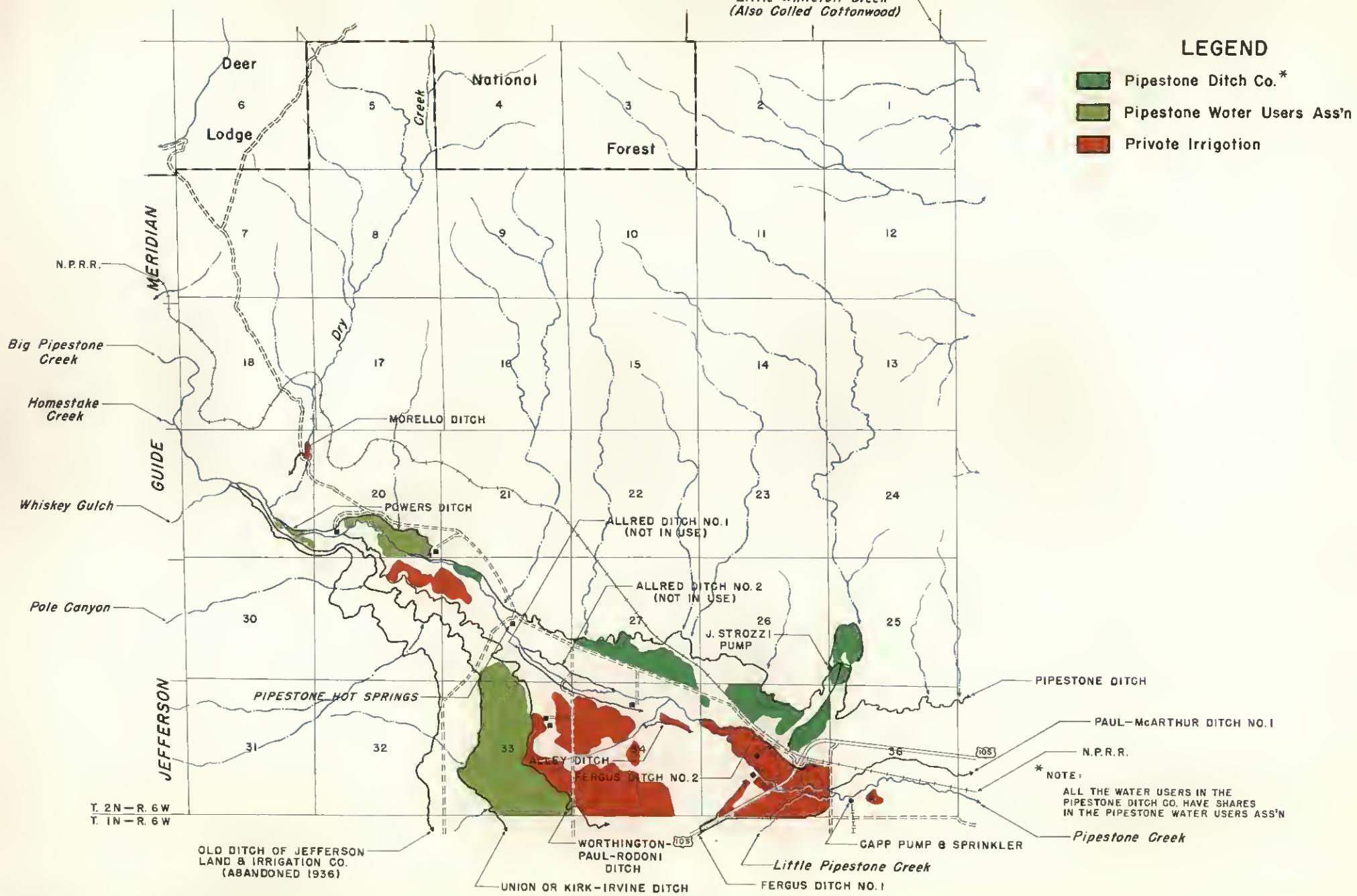
Twp. 2 NORTH

Rge. 5 WEST

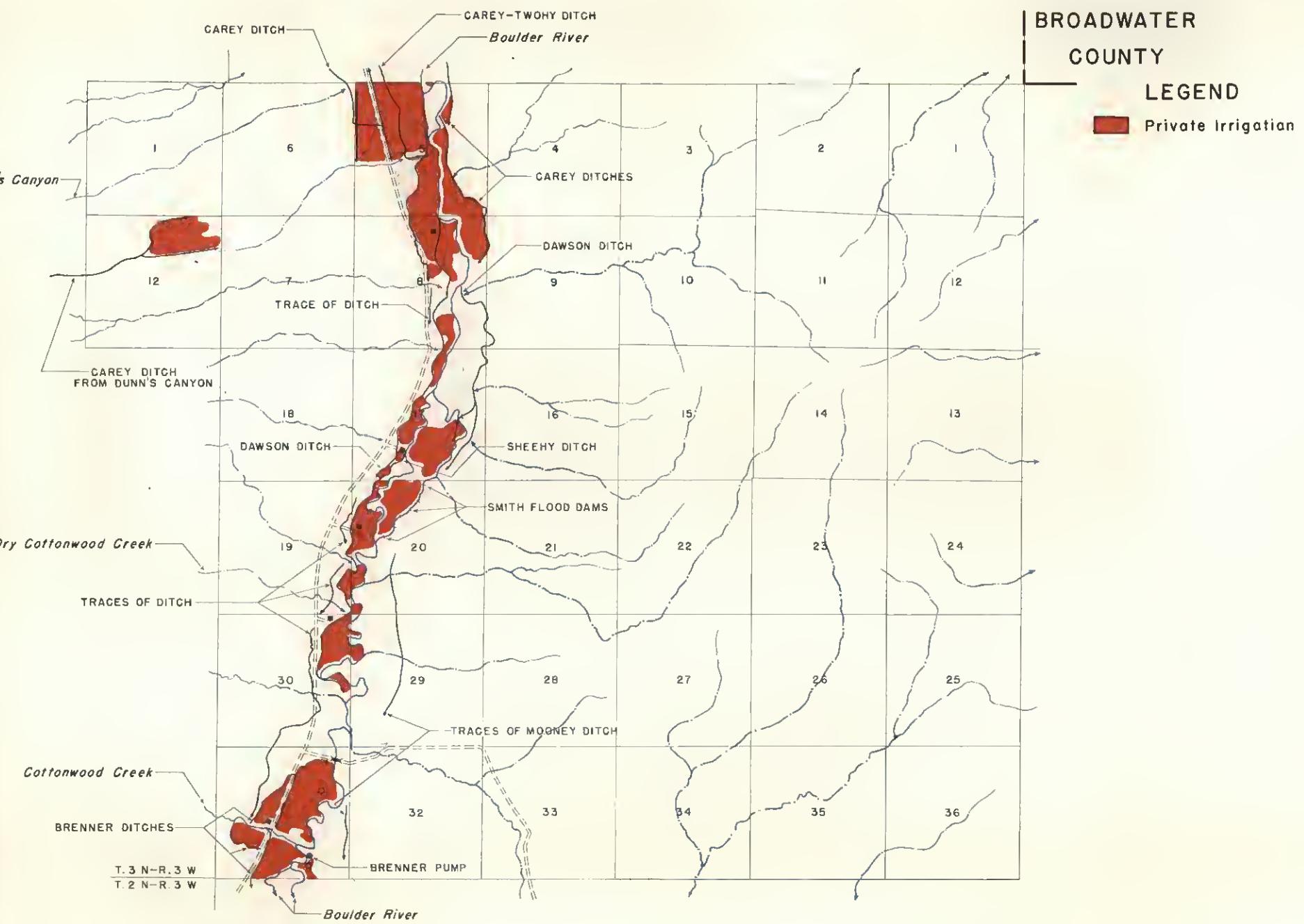
Little Whitetail Creek
(Also Called Cottonwood)

LEGEND

- Pipestone Ditch Co. *
- Pipestone Water Users Ass'n
- Private Irrigation

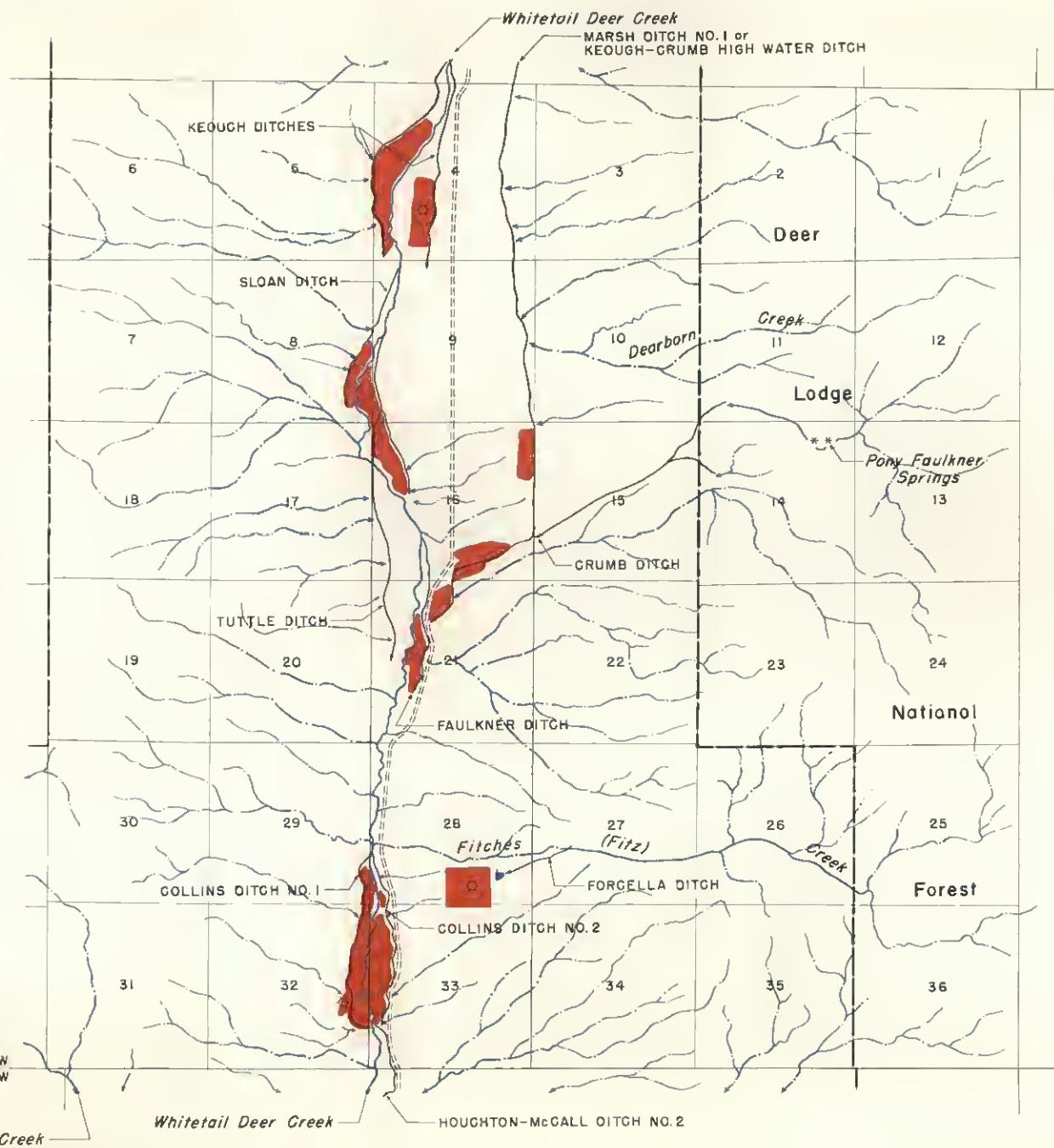


Twp. 3 NORTH
Rge. 2 & 3 WEST



Twp. 3 NORTH

Rge. 4 WEST

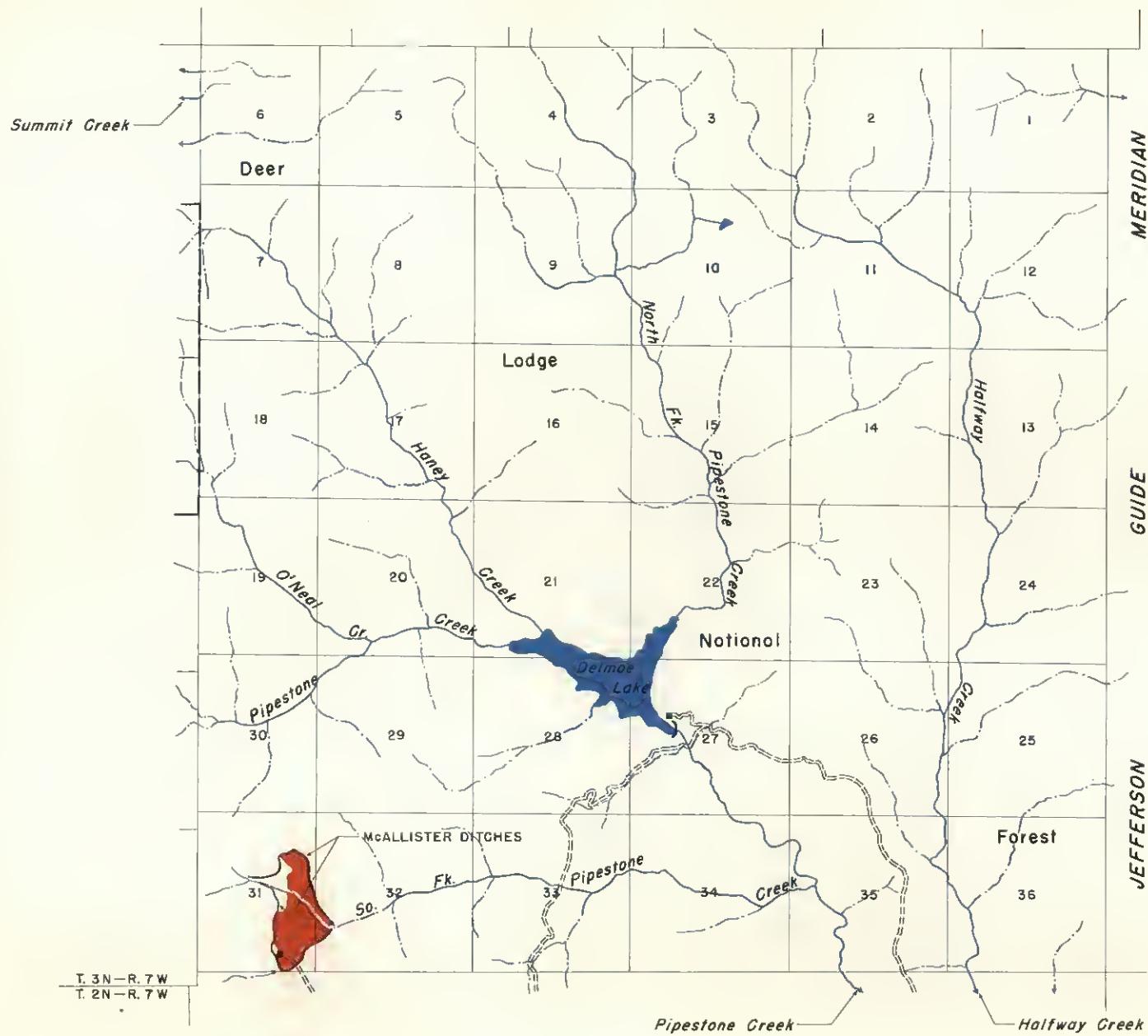


LEGEND

■ Private Irrigation

Twp. 3 NORTH

Rge. 6 WEST



LEGEND

■ Private Irrigation

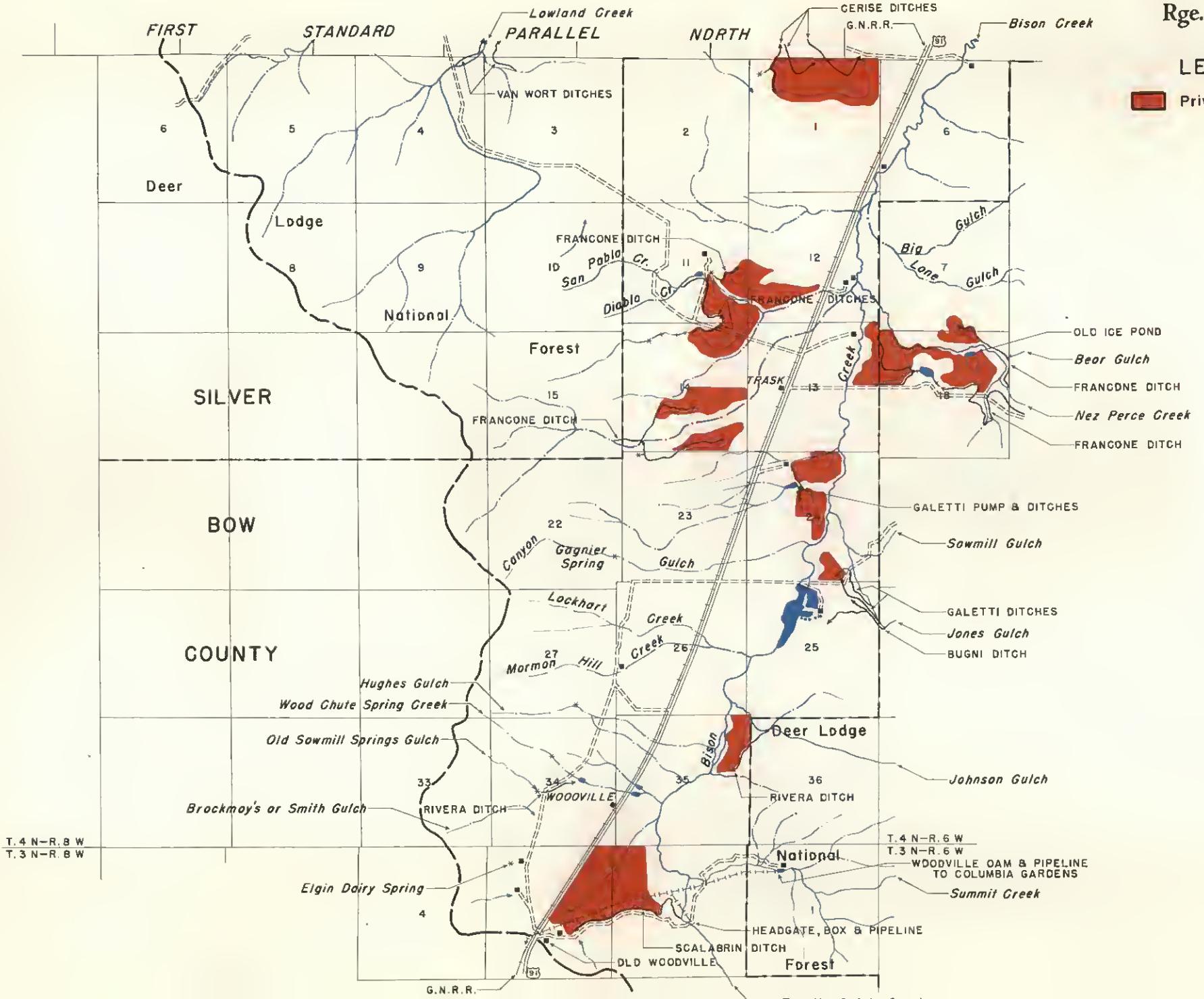
T. 3N - R. 7W
T. 2N - R. 7W

Twp. 4 NORTH

Rge. 7 WEST

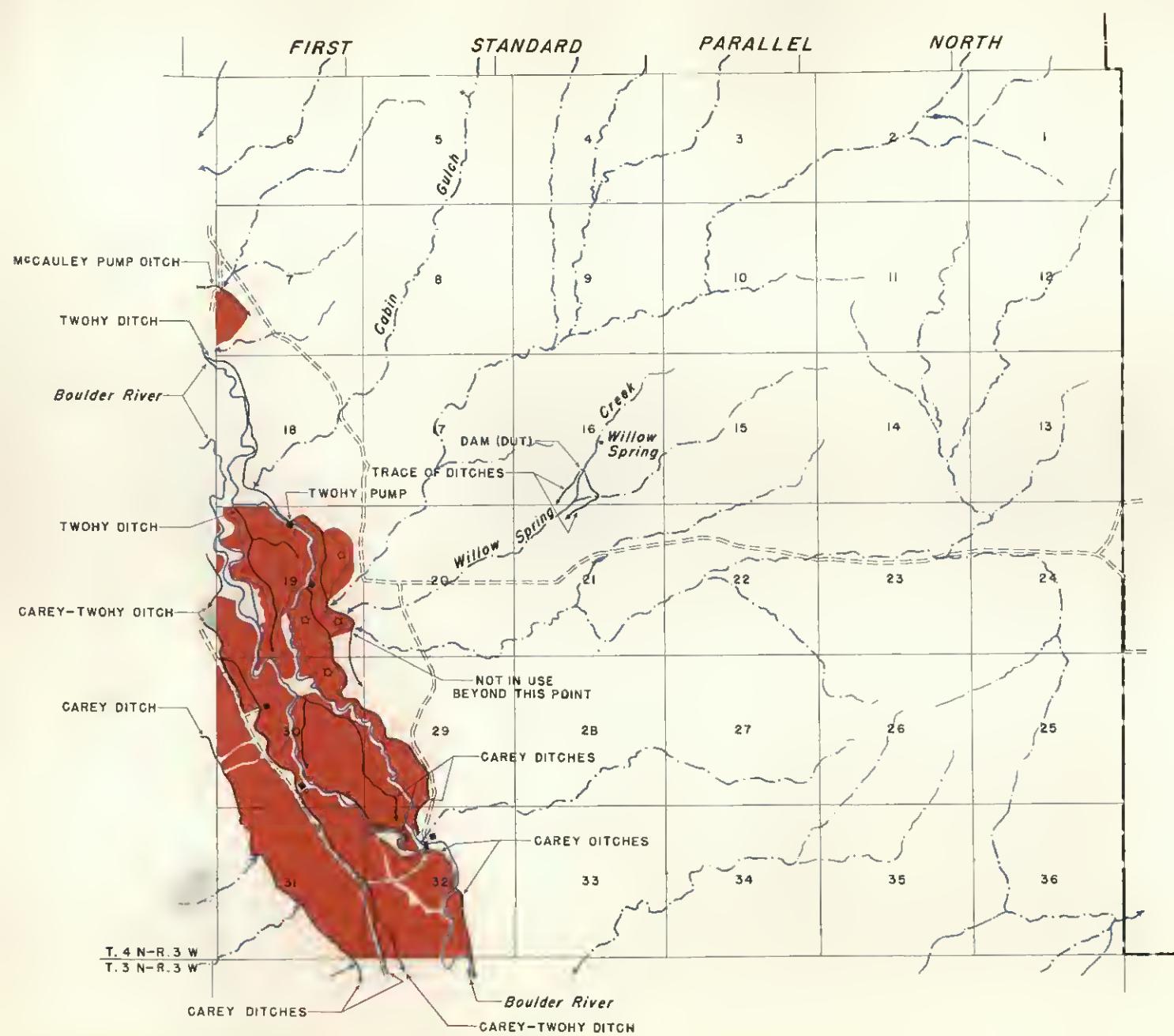
LEGEND

■ Private Irrigation



Twp. 4 NORTH

Rge. 2 WEST

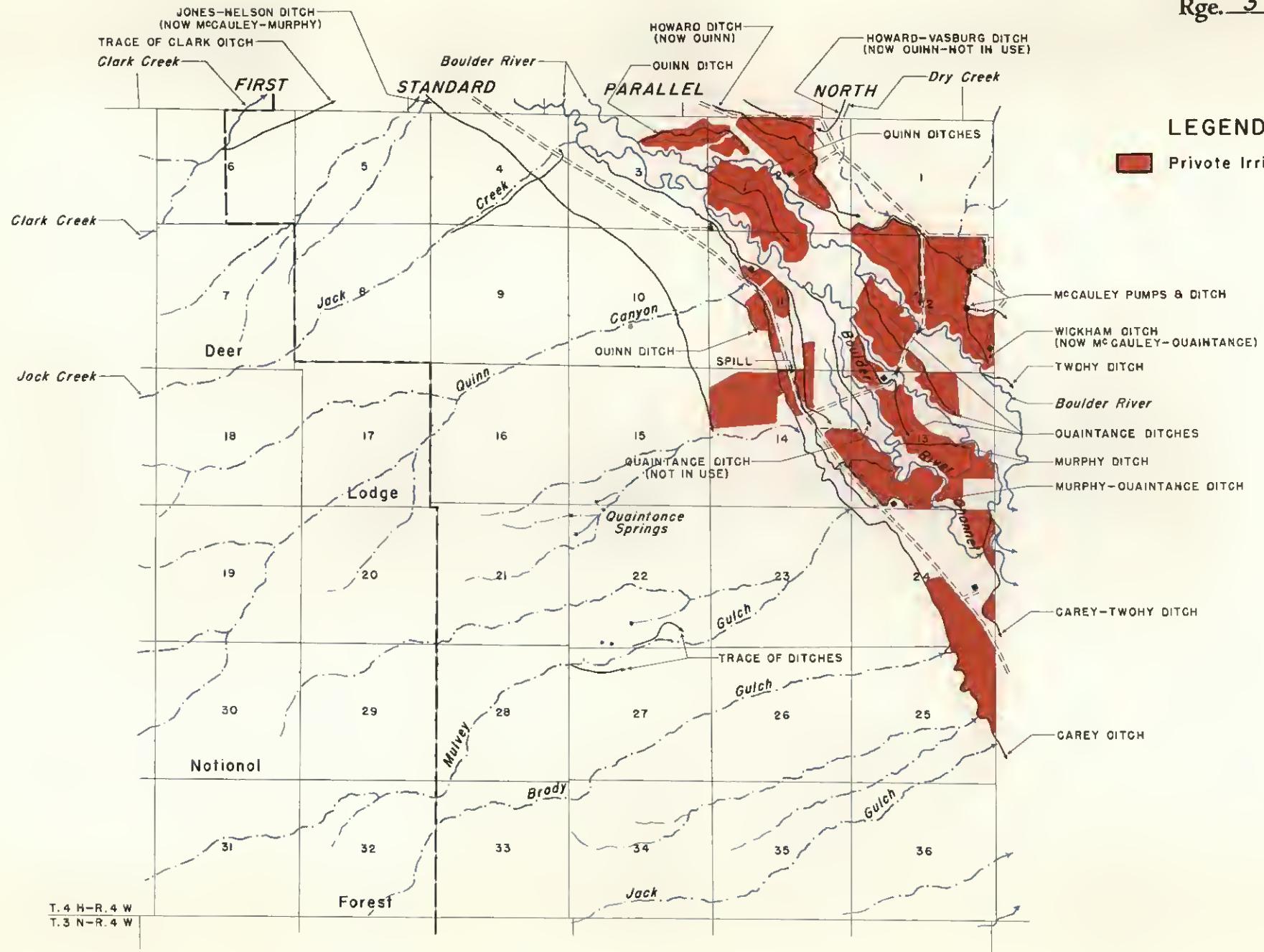


BROADWATER

COUNTY

Twp. 4 NORTH

Rge. 3 WEST

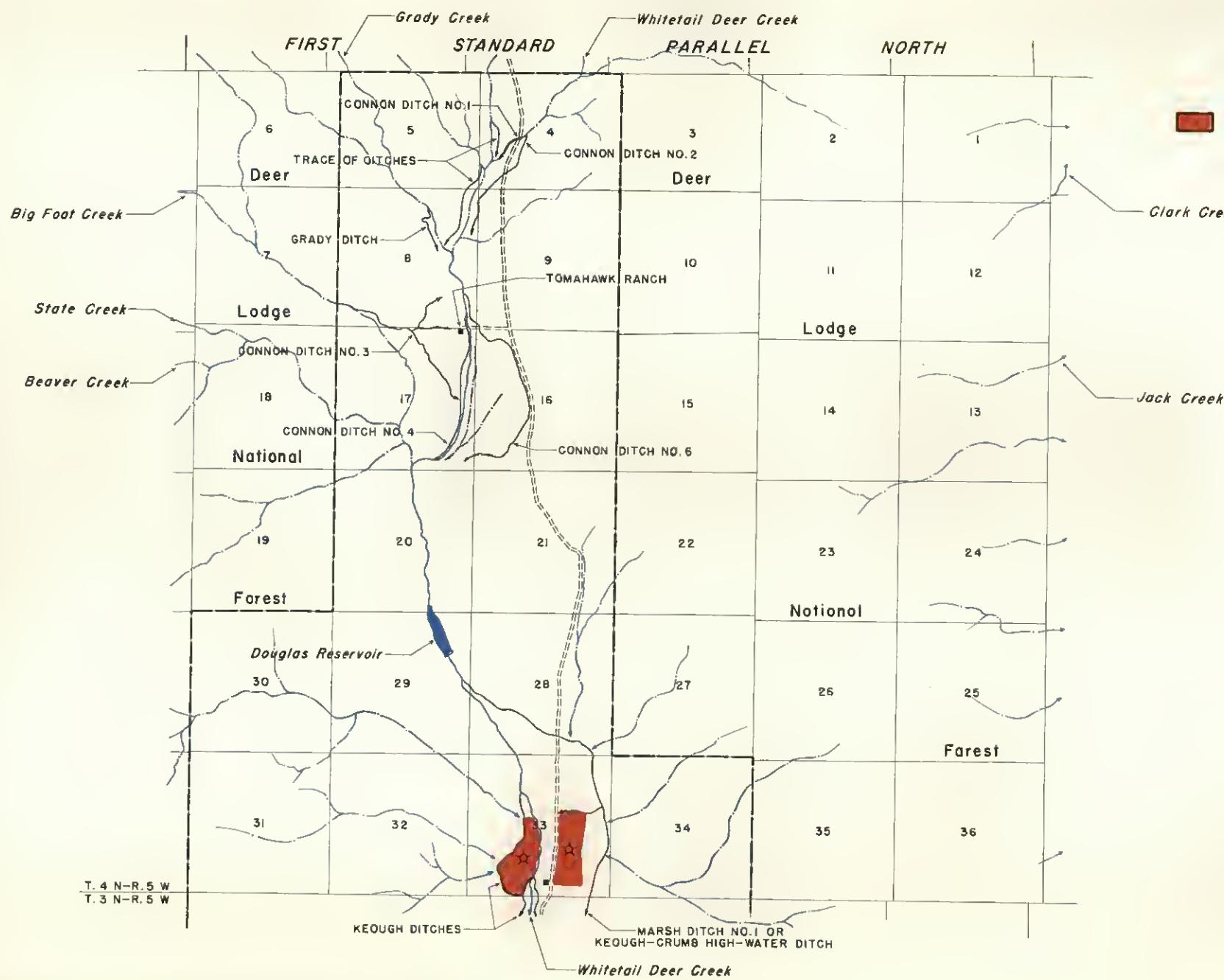


LEGEND

■ Private Irrigation

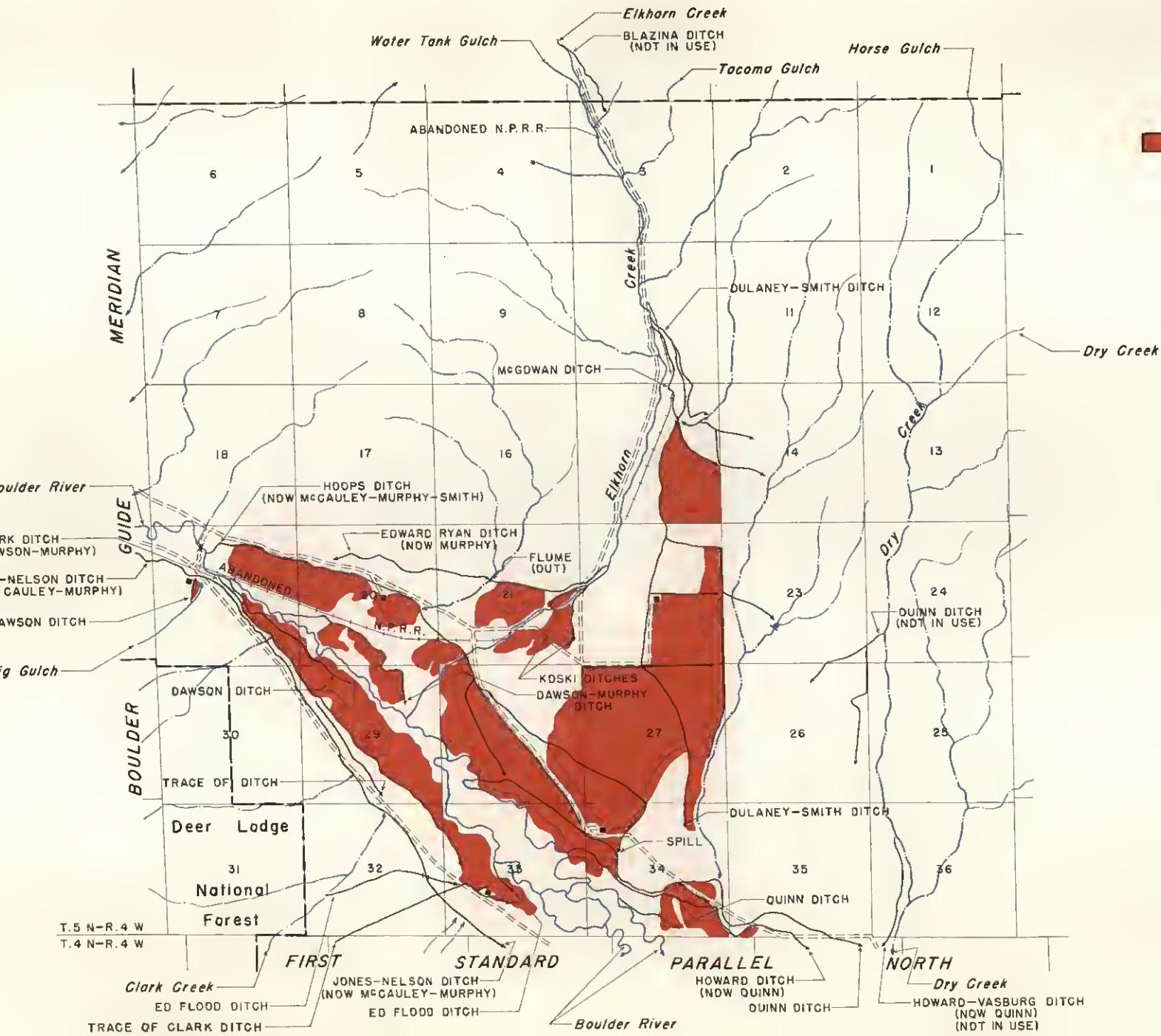
Twp. 4 NORTH

Rge. 4 WEST



Twp. 5 NORTH

Rge. 3 WEST

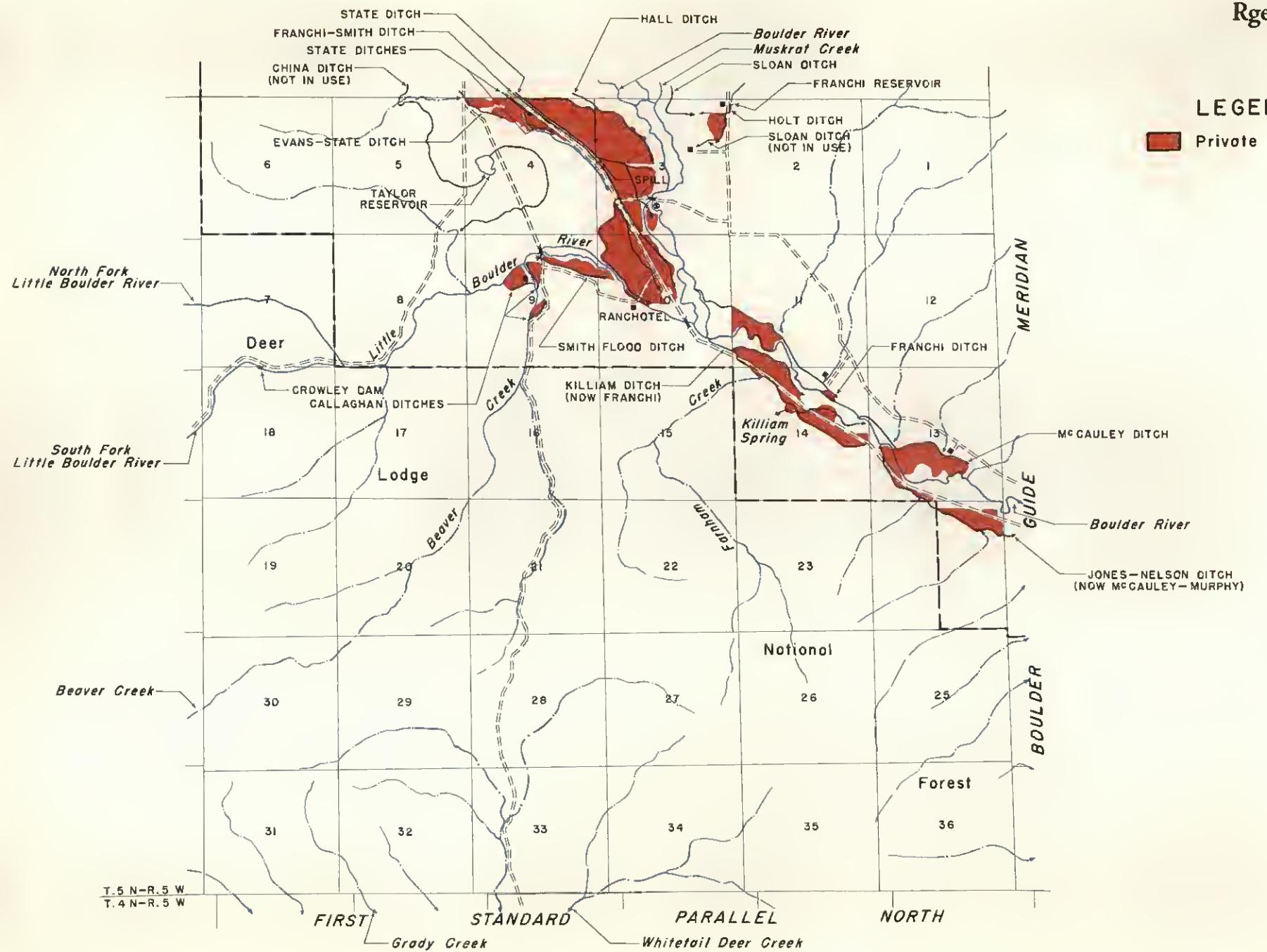


Twp. 5 NORTH

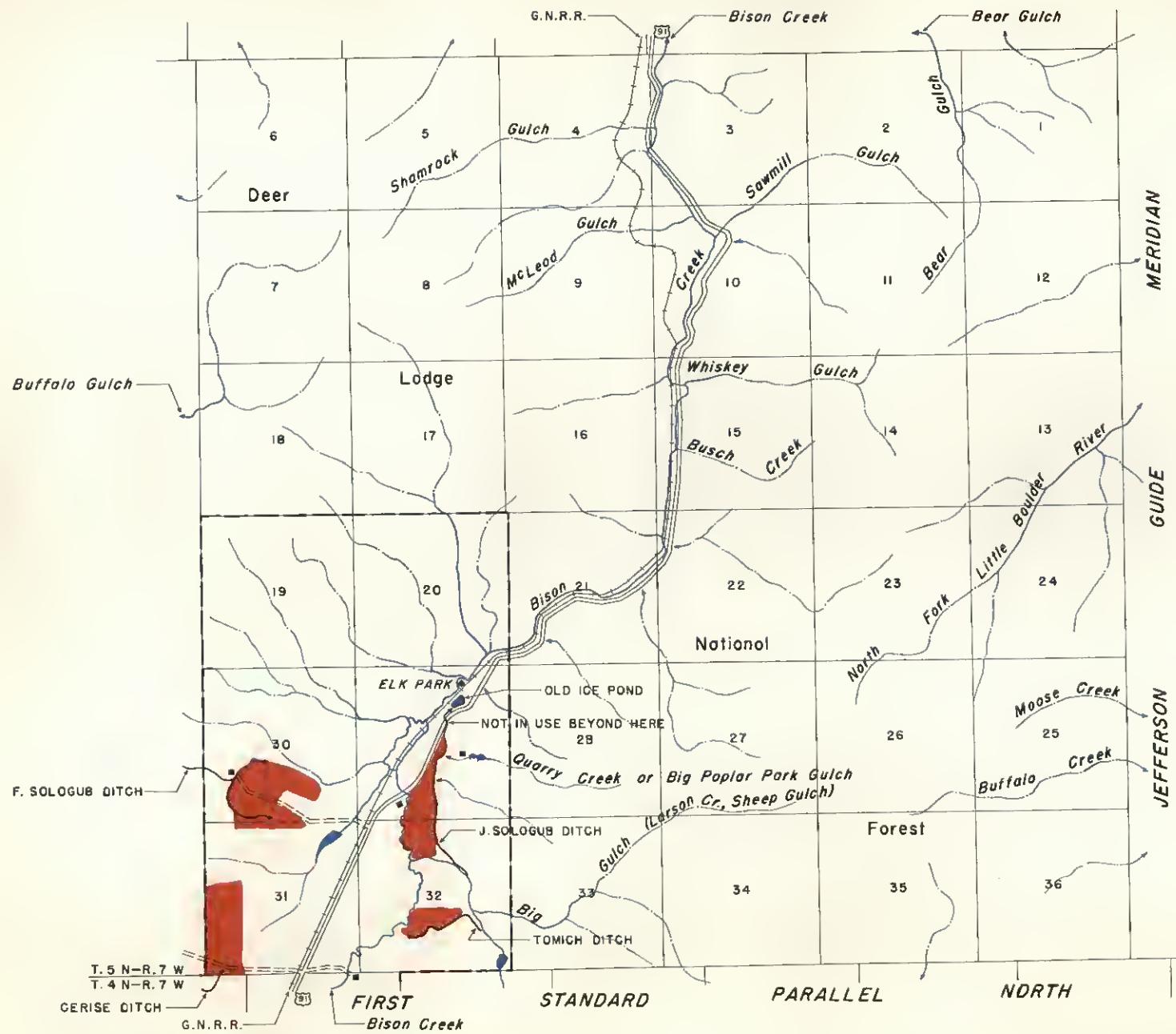
Rge. 4 WEST

LEGEND

■ Private Irrigation



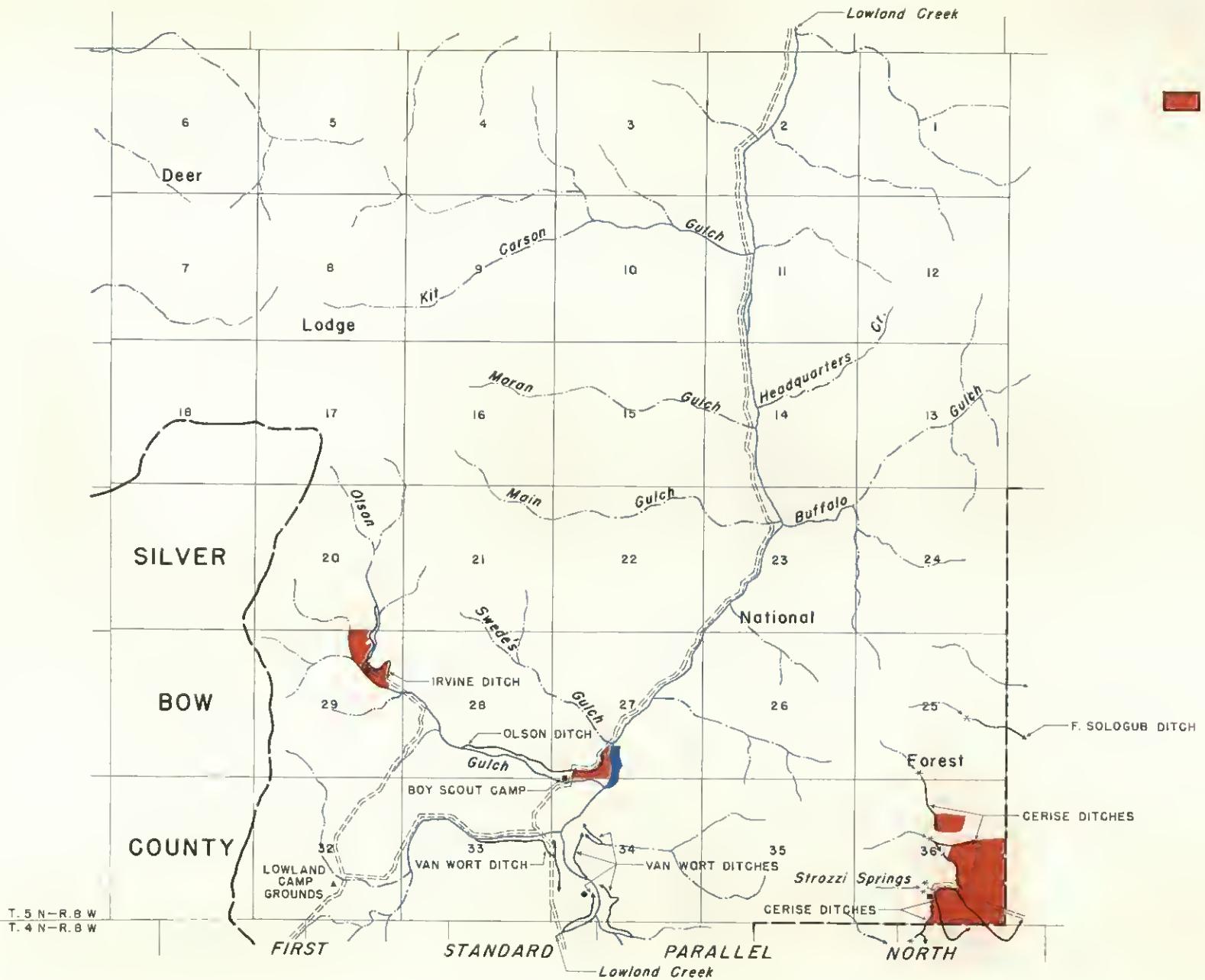
Twp. 5 NORTH
Rge. 6 WEST



LEGEND

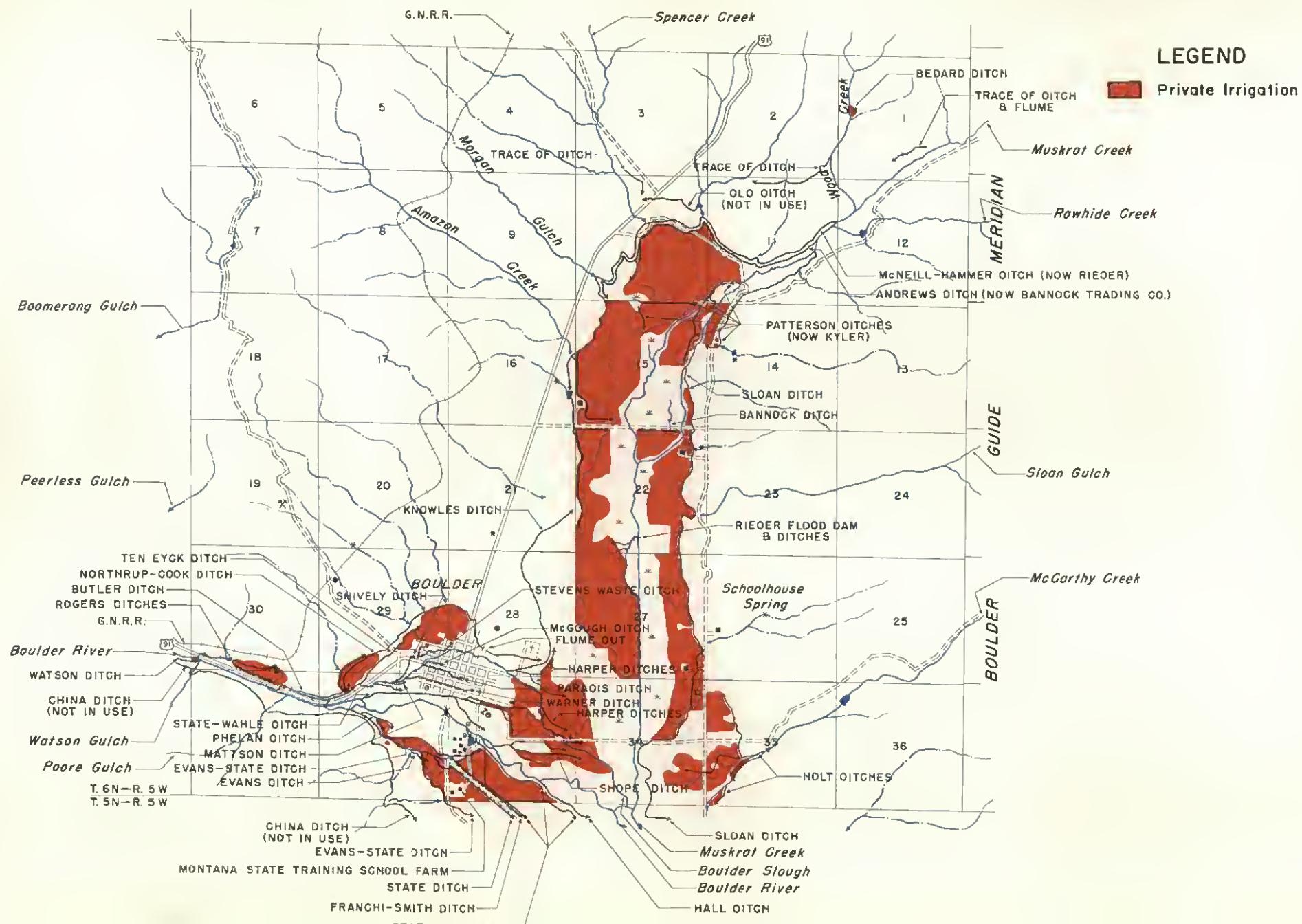
Private Irrigation

Twp. 5 NORTH
Rge. 7 WEST



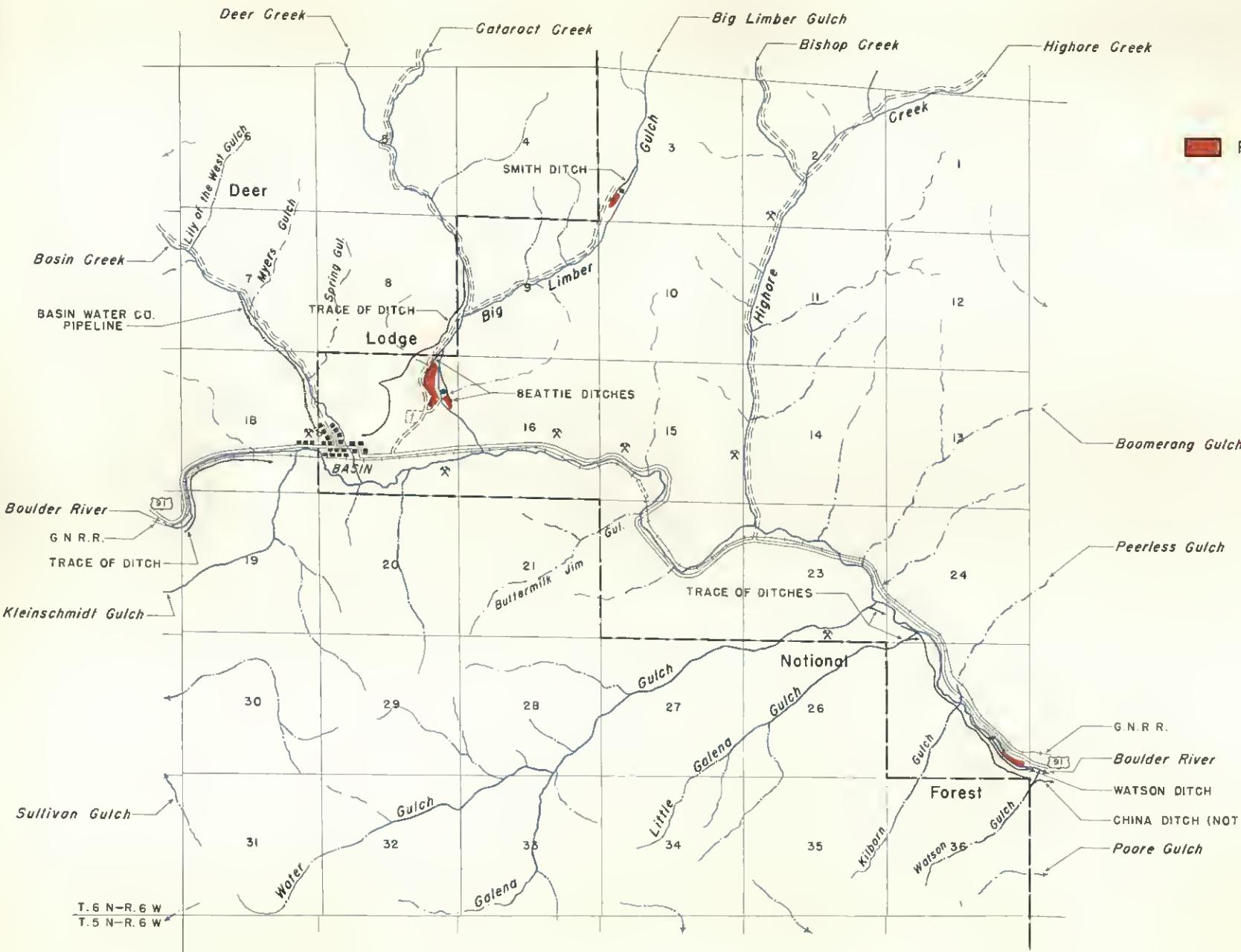
Twp. 6 NORTH

Rge. 4 WEST



Twp. 6 NORTH

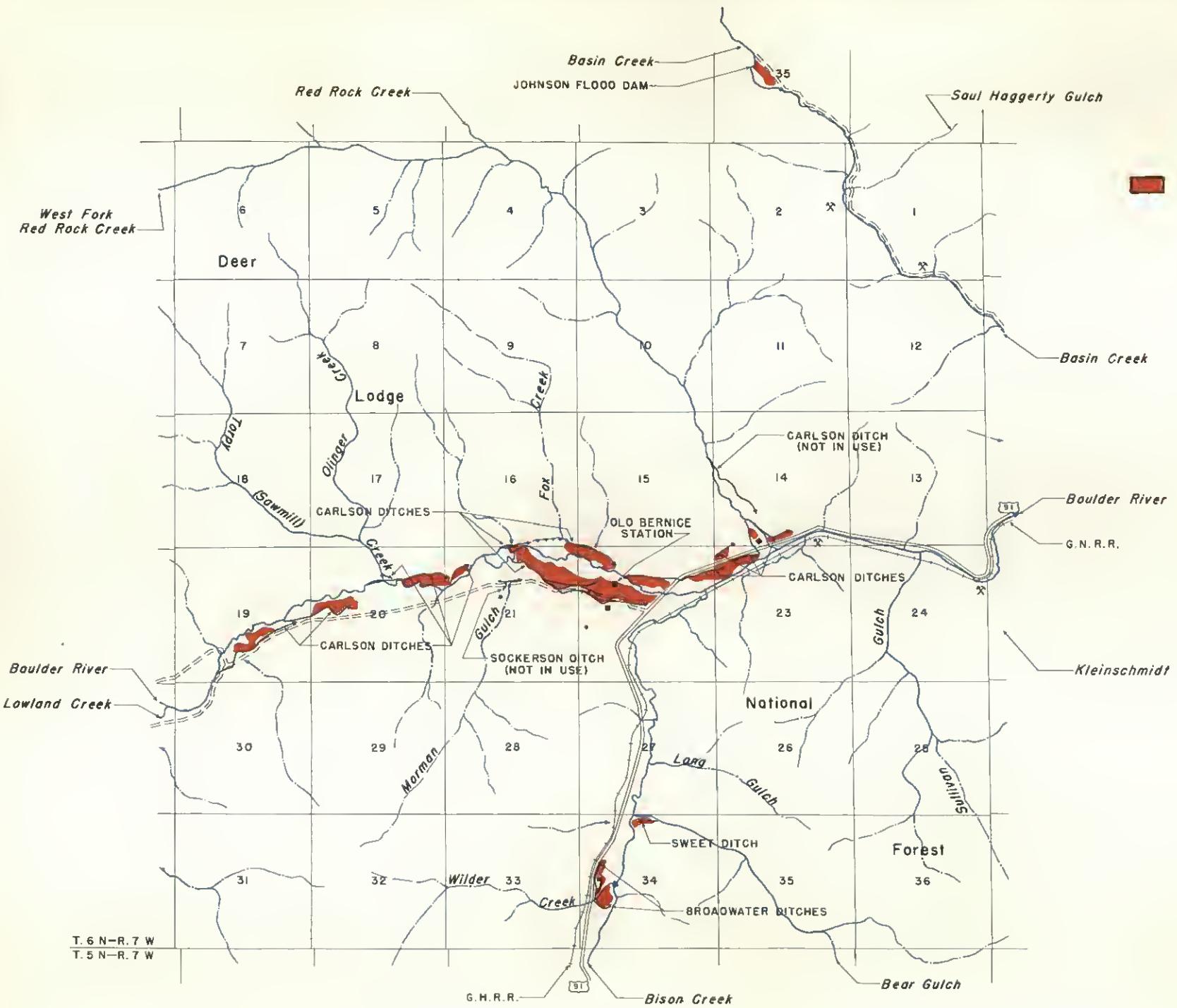
Rge. 5 WEST



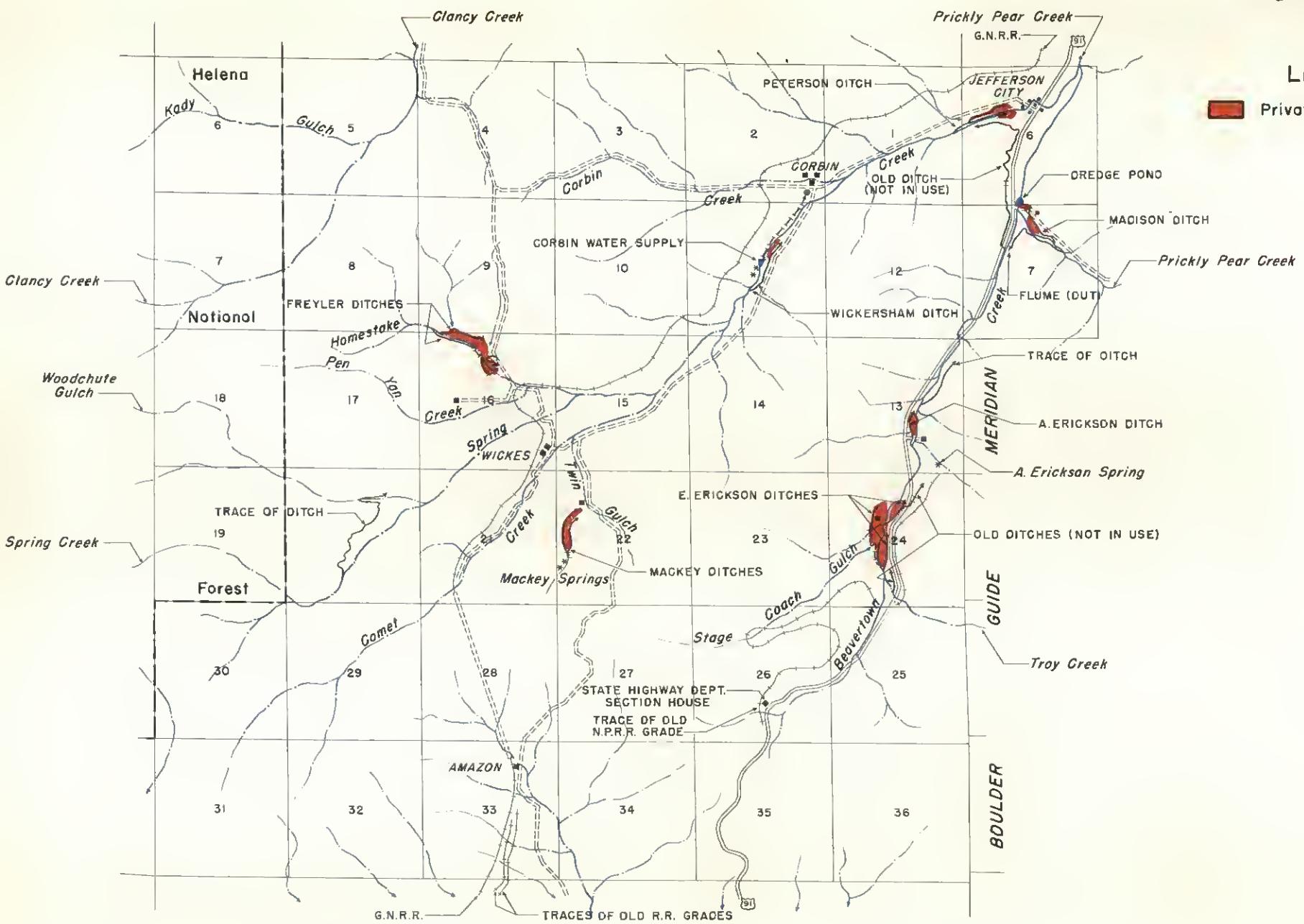
LEGEND

■ Private Irrigation

Twp. 6 & 7 NORTH
Rge. 6 WEST



Twp. 7 NORTH
Rge. 3 & 4 WEST



LEGEND

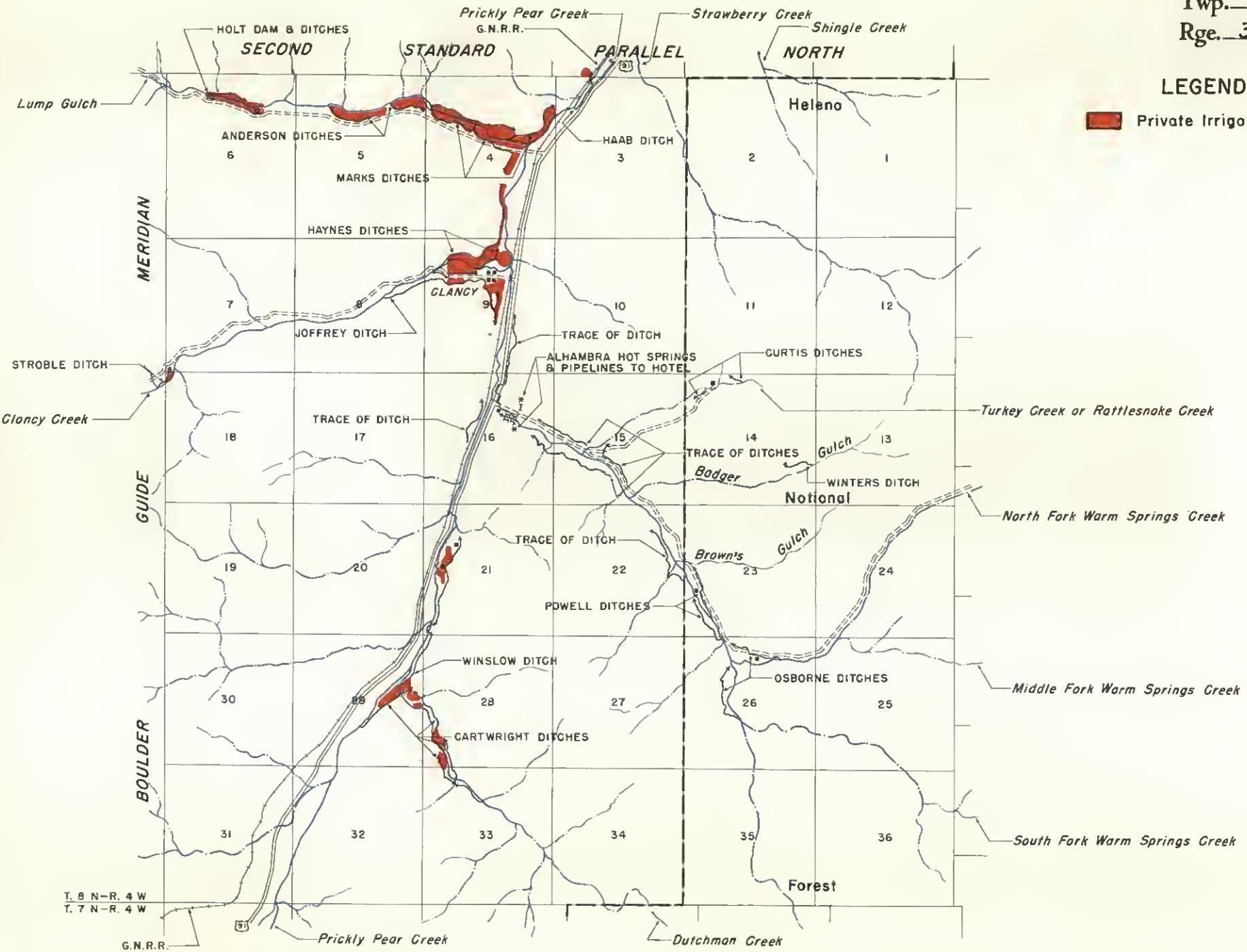
■ Private Irrigation

Twp. 8 NORTH

Rge. 3 WEST

LEGEND

■ Private Irrigation

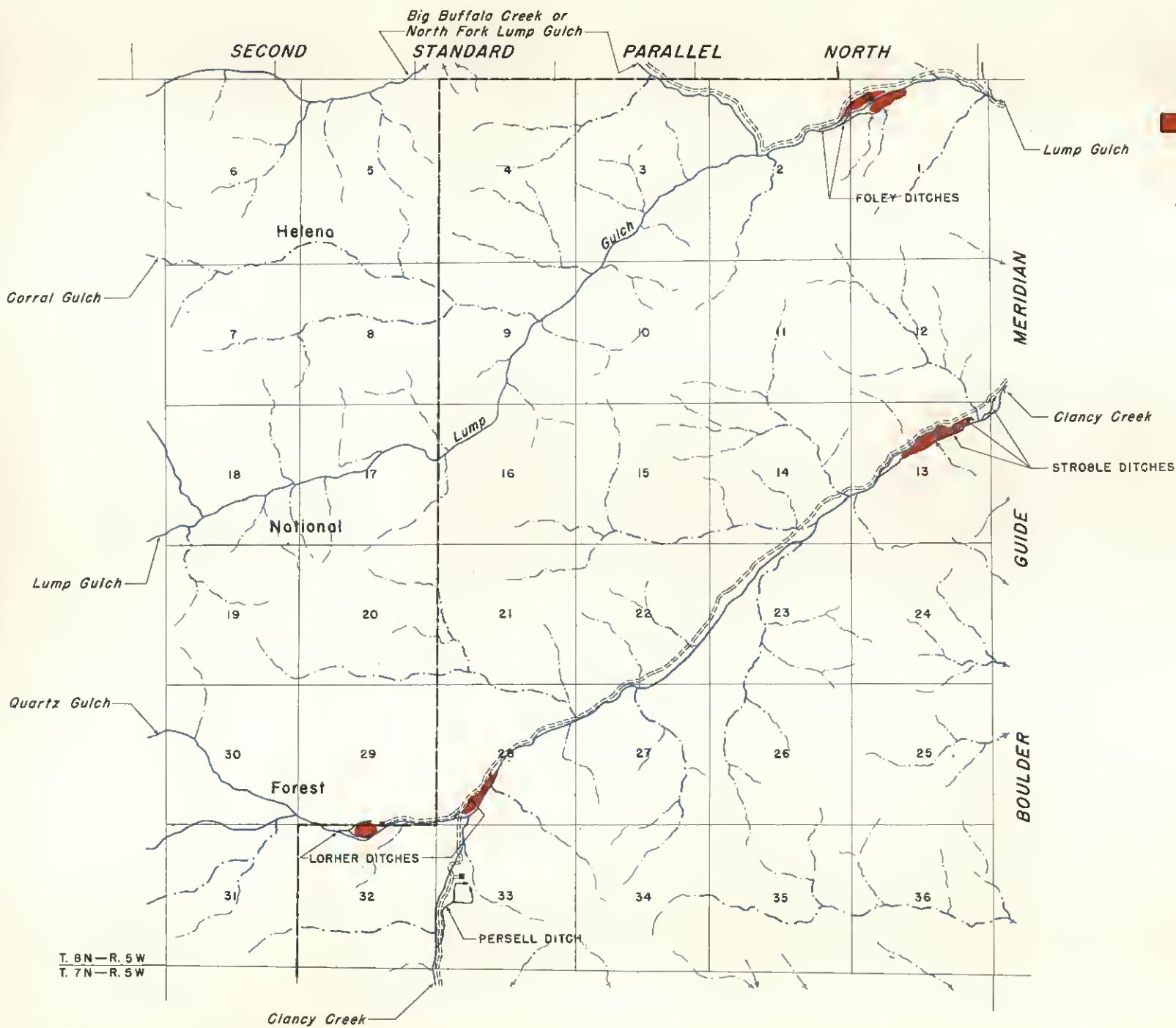


Twp. 8 NORTH

Rge. 4 WEST

LEGEND

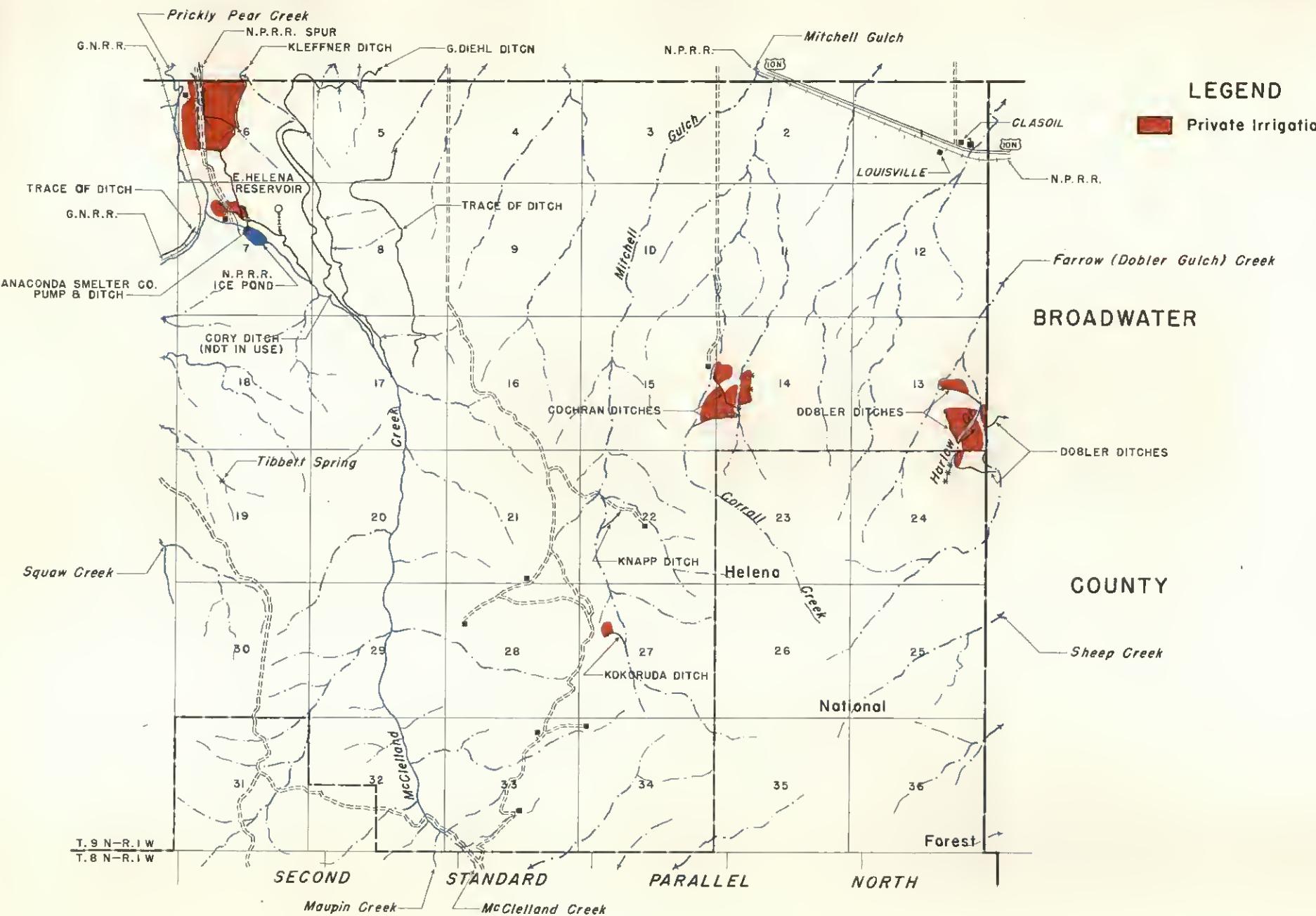
■ Private Irrigation



LEWIS AND CLARK COUNTY

Twp. 9 NORTH

Rge. 2 WEST



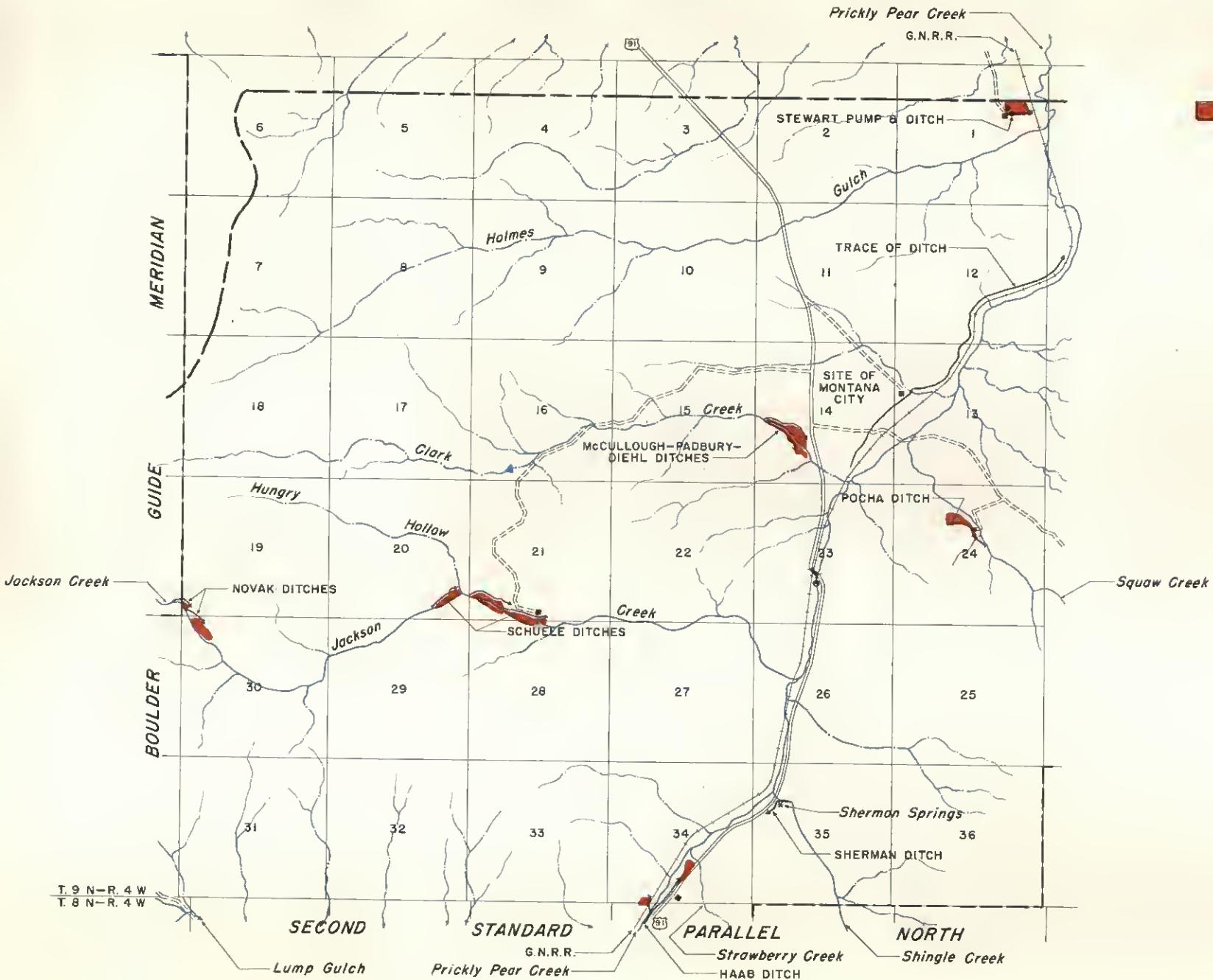
LEWIS AND CLARK COUNTY

Twp. 9 NORTH

Rge. 3 WEST

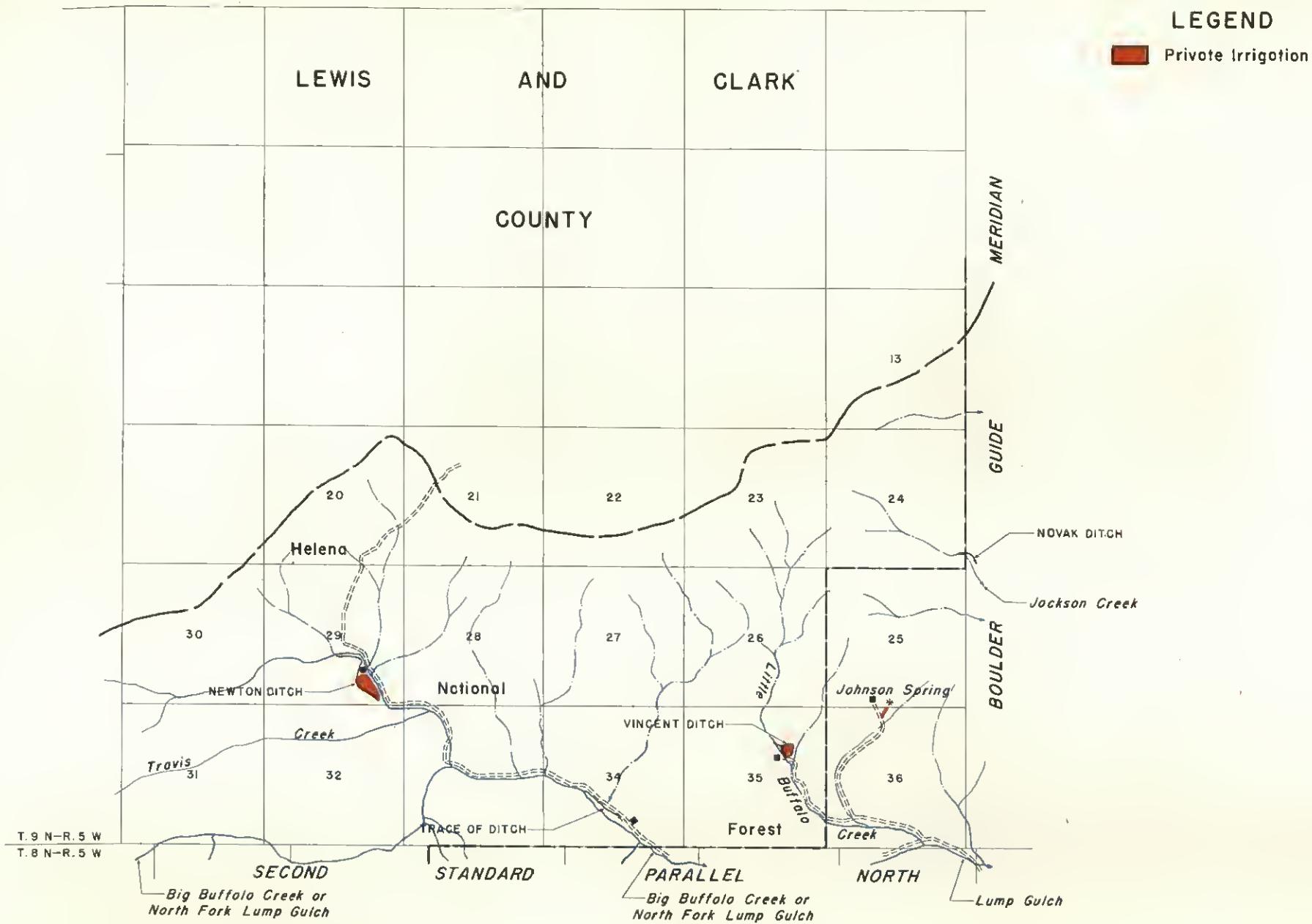
LEGEND

■ Private Irrigation



Twp. 9 NORTH

Rge. 4 WEST



Twp. 1 SOUTH
Rge. 4 & 5 WEST

MERRION

GUIDE

IEEE 802.11

T. 1 S - R. 6 W
T. 2 S - R. 6 W

